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VETERINARY MEDICINE

JULY CONTENTS 1949

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Introducing a New Editor

Observant readers will have noted the name, Robert L. Anderes, on our masthead. Doctor Anderes joins the editorial staff of VETERINARY MEDICINE well qualified by training and experience for the varied and exacting duties of the position. He received a B.Sc. degree in dairy husbandry from the Kansas State College in 1925 and his D.V.M. from the same institution in 1934. Following graduation he served for a time on the staff of the North Shore Animal Hospital and later as head of the department of clinical medicine of the Jensen-Salsbery Laboratories; leaving the latter position to enter the Army Veterinary Corps as a captain, in January 1941 to serve with the Arms and Service Group of the Office of the Surgeon General. He was consecutively stationed at the Medical Supply Depot, St. Louis; as Medical Supply Officer, Engineer Depot at Cincinnati; as Executive Officer of the Louisville Medical Depot; Commanding Officer of the Medical Section, Richmond ASF Virginia; and Commanding Officer of the Medical Section, Atlanta ASF Depot. He was separated from the military service in the grade of Colonel in February 1946. Since leaving the Army he has been engaged in private practice in Kansas City, Missouri.

Doctor Anderes' first concern will be improvement of clinical aspects of VETERINARY MEDICINE with added responsibilities as orientation progresses. Veterinary journalism will afford the new editor full scope for the exercise of his energy and abilities. It supplies the graduate instruction for the great mass of the veterinary profession which advances only along the trail blazed by its periodical press. VETERINARY MEDICINE has piloted the advance of veterinary science in this country for two score years. To mention only the broad changes that have come about in veterinary practice in the first two decades of the century: It began to stress the importance of swine practice when the average veterinarian either refused to make a call to a herd of swine or apologized for doing so. It inaugurated a section on Canine Medicine and Surgery in 1912 when even the larger cities

Robert L. Anderes

had but one or two practitioners who "specialized" in the treatment of dogs. At the same time but with less success it promoted the study of poultry pathology and cultivated an appreciation of the importance of the poultry industry and the service the veterinary profession could render in that field. In 1913 it began urging the reorganization of the A.V.M.A. on a plan that was 20 years in coming, but has been responsible for the growth of the national association during the past 15 years. Its leadership between the World Wars is of too recent vintage to need recounting.

To repeat, editor Anderes' opportunities to serve his profession will be limited only by his willingness, his ability and his industry. That he possesses all three in unusual measure, he has already given ample evidence.—D. M. C.

* * * *

We live in the present, we dream in the future, but we learn eternal truths from the past. —*Madame Chiang Kai-shek.*

* * * *

Serum Prophylaxis after Exposure to Rabies

The above designates the title of a paper presented before the section on experimental medicine and therapeutics, American Medical Association in Atlantic City on June 8th of this year, by Dr. Hiliary Koprowski, M.D., Pearl River, N. Y. Doctor Koprowski's paper reporting experimental studies on rabies virus was abstracted in *Veterinary Medicine* for June 1949, page 275. The demonstration of the protective ability of the new chick embryo cultured fixed rabies virus vaccine experimentally and now a prophylactic serum following exposure is expected to be revolutionary.

* * * *

The Good Old Days Were Rugged

Arthritis is the most common disease of modern man above the age of 40. The same is true of man throughout recorded history and beyond. The fossils of pre-history tell the same story. The cervical vertebra and the lumbar veterbra of the famous Neanderthal man of La Chapelle are ankylosed. Nor is caries a product of modern civilization, 30% of New Stone Age fossils (10,000 years old) were so afflicted, as were 40% of pre-Columbian Indians of our Southwest. Aortic plaques have been found in Indian mounds and remember "the Lord hardened his [Pharaoh's] heart" so arteriosclerosis and heart disease are not modern developments, nor is tuberculosis or other skeletal infections.

An outbreak of influenza in a herd of swine prepares an inviting field for the hog cholera virus.

* * * *

Sodium fluoride is the most effective ascaricide against the common roundworm in swine; its efficiency varying between 95 and 100%.

* * * *

McCullough (U. S. Public Health Service) and Eisele and Pavelchek (University of Chicago) report, in *Pub. Hlth. Repts.*, the isolation of *Brucella abortus* from the submaxillary lymph nodes of eight swine, slaughtered in a large Chicago abattoir. This is the first reported instance of the isolation of the bovine type of the Brucella organism from naturally infected swine.

* * * *

According to Dr. John B. Herrick, Iowa State College, Ames, Iowa, the boar ejaculates a larger volume of semen than any other farm animal. As much as 480cc have been collected from a mature boar at a single service taking 20 minutes to collect the sample. The average volume of seminal fluid from a 250 to 300 pound boar is from 150 to 200cc.

Studies of sperm concentration show the range of 25,000 to 1,000,000 per cubic millimeter, the most common concentration will average 100,000.

The chief obstacle to a widespread use of artificial insemination of swine in this country is a lack of standardization in production testing and sire proving. The insemination of more females with semen obtained from proved superior sires constitutes a primary advantage in artificial insemination of swine.

* * * *

Causes of Losses of Young Pigs

Numerous ailments of young pigs on eastern Iowa farms are traceable to causes which happened before the pigs were born. Many of these losses are caused by overfeeding of corn to the sow during gestation. Last spring, there was a noticeable absence of such conditions when corn had been fed sparingly. Lack of animal protein, lack of essential vitamins and/or minerals in the diet during gestation and too little exercise account for many baby-pig troubles. Dietary scours is found on many farms, every year. The same is true of anemia. Toxemia-uremia in young pigs is not recognized as often as it occurs. Hog cholera, swine erysipelas, pneumonia, respiratory diseases, intestinal infections, pox, mange and rickets, all have contributed to losses this spring, yet a better than average pig crop is expected in most eastern Iowa areas.—*Bulletin Eastern Iowa Veterinary Association.*

Sulfaquinoxaline is too toxic for use in human medicine but in chicks it has no ill effects in very low concentration—0.025% in the mash.

* * * *

A combination of aureomycin and dihydrostreptomycin appears to be the most promising treatment for brucellosis in persons. According to the Mayo Clinic this remedy seems better than other antibiotic agents, used singly or together.

* * * *

Correction

In the abstract, "Preliminary Report of the Probable Egg Transmission of Infectious Sinusitis of Turkeys" on page 272 of the June issue of VETERINARY MEDICINE, an error occurs in the index numbers of the dilutions with which the embryos were inoculated. In the order given they should read: 10^{-4}, 10^{-5} to 10^{-9} and 10^{-9}. The dilutions which killed embryos should read in the order given: 10^{-5}, 10^{-6}, 10^{-7}, 10^{-8}. The dilution that failed to kill embryos should read 10^{-9} and the final dilution in the last line on the page should read, 10^{-8}.

* * * *

Penicillin Therapy Abuse

Penicillin therapy has worked a greater revolution in the practice of medicine both human and veterinary than any other substance in recent years. This product has been abused as have many others in the early days of employment. We have learned of the widespread application of penicillin in pathologic conditions, but too often have failed to take cognizance of its limitations. Certainly penicillin is not indicated in all infections and certainly not in other than infectious ailments. Neither is an owner's request excuse for its promiscuous use. Giving a patient a "shot" of penicillin can hardly be expected to fulfill the purpose for which the product is intended.

Sensitivity to penicillin is reported in approximately 5% of the human patients, initially receiving it and in 25% of those who have received it previously. To some lesser extent is this also true in animals. The situation tends to resolve itself into a position where hypersensitivity and penicillin resistant organisms exist separately or together in a patient whose condition might otherwise have responded promptly to the use of this remarkable antibiotic agent. Previous abuse of penicillin may therefore be responsible for its failure in cases where its effect is desperately needed.

Use penicillin judiciously, develop therapeutic blood levels, hold for the recommended time and delete it from the treatment as early as practical. It may be needed again.

* * * *

Noble Experiment in Mexico

It would be almost miraculous, comments *Hoard's Dairyman* (May 10, 1949) editorially, if the officials (in Mexico) could go into sections where foot and mouth disease exists and find all the goats and sheep and deer and cattle and vaccinate them.

Reports that come from Mexico are conflicting. Some would indicate that satisfactory progress is being made, while one would gather from others that many years of work will be necessary before this disease is eradicated from the plains and mountains of our southern neighbor republic. The new vaccine may be better that any previously employed agent and it is hoped that the plan to vaccinate all cloven-hoof animals three times in one year will break the virus cycle and eradicate the disease. Considering factors of terrain, popular attitude and wild life population, some doubt prevails that even this vaccination program can accomplish effective results.

We can and must give our support to any practical method of eradication if for no other reason than a selfish one. We do not want any livestock losses in southern herds because of failure to flag this dreaded malady before it can cross the international boundary. Border officials must be given credit for the good work done, since to date no foot and mouth disease has developed. At the same time any lack of vigilance based on vaccination success stories may well be catastrophic.

The recent outbreak of the disease near the northern quarantine line, in an area where the cattle have been vaccinated, will give *Hoard's Dairyman* and some other livestock publications an opportunity to scream that the vaccine has failed. They would be doing their industry a better service to explain that under the conditions prevailing in Mexico occasional failures in the application of eradication measures are unavoidable. It is remarkable that to date there has been but one major setback to the program. The vaccine, as shown by the most exhaustive tests given any veterinary biological product, does not fail, (except as is the case with all biologics, in rare instances on animals, that seem incapable of immunological response). However, those who use it sometimes fail. The means developed by the Mexico-American Commission to assure that every cloven-hoof animal in a given area is vaccinated are remarkably efficient, but to expect perfection in execution is to betray *naiveté* in the art—not necessarily the science—of disease control

Are Associations Spending Their Funds Wisely?

It is by no means unusual to hear speakers at veterinary meetings deplore what they term the poor public relations of veterinary medicine, present and past. These statements are often in support of raising the dues of members of the Association and employment of professional public relations counsel.

The statement that the veterinary profession has not advertised its wares and itself adequately, for that is what is meant by poor public relations, is seldom or never questioned. No more is questioned the value of the publication of news items about veterinarians and short news stories about the work of veterinarians, in newspapers or broadcasting them over the radio as a means of enhancing the prestige of veterinary medicine and raising the public's appraisal of veterinary service.

Both statements should be examined before acceptance. If sound, they will be better grounded for the investigation. If spurious it should be discovered. There is a very old saying that "actions speak louder than words." Veterinary service has been speaking through actions for a long while. A sudden burst of words is not likely to nullify the effect of those actions. About the best they can do is to supplement them, and it may be, that the same effort put into improving service would speak "louder."

Possibly, not to say probably, the public is not easily informed by words. It may be that industries, not only essential to the civilization we maintain, but necessary to life itself are not better known to the public than veterinary medicine.

If one should ask the next 100 persons one meets whence comes the meat they eat, one might get 90 correct answers. But ask the source of insulin necessary to the day to day living of 2,500,000 persons in the United States, or of adrenalin, first thought in most emergencies threatening life, or pituitrin or other by-products of the slaughter of animals for food and one will be fortunate indeed to get five correct answers in 100 trials. The livestock industry is much older than civilization and yet thrives largely unknown. The great department stores who spend millions yearly on public relations put their message in the advertising sections of the newspapers and in radio commercials where they can repeat them again and again and again. The better ones employ "puffs" sparingly. The excellent publicity of the Associated Serum Producers follows the same plan.

Surely it is conservative to say the average annual dues of all but local veterinary associations have been doubled in a decade. Very likely the average increase among state veterinary associations is considerably greater, and they are still being raised. That has seemed of no consequence during recent lush years. But does anyone remember when an association lowered its dues? If any think these high-priced memberships wouldn't decrease in number by one-half or more if the agricultural conditions of the 20's and the 30's were reënacted, let them remember that the A.V.M.A. has twice in this century, which is not yet half over, forgiven the dues of members delinquent one to 10 years, to prevent a serious loss of membership. And the annual dues when that happened were only $5.00. The membership of the largest state association dropped from 700 in 1921 to 175 in 1926 and the dues were only $2.00. Membership is a more fundamental requirement for a veterinary organization than publicity. It is simple now to have both, but optimistic commitments in fat years may mean the organization will have neither, if and when lean years come, for as before stated, in this century no veterinary association has solved the problem of reducing its dues in times of financial stress.

This is not to argue against a public relations program for veterinary associations, but only that they be not accepted as something inspired and sacrosanct. One state association has raised its annual dues from $5.00 to $20.00 in the past three years and in addition voted a special assessment of $10.00 last year and $15.00 this year for a greatly expanded public relations program. A majority of the members think they are getting good value from their expenditures on public relations. The $64.00 question is, will they think the same thing later?

Maurice C. Hall, the ablest veterinarian of his generation, once said if the veterinary profession could produce a Pasteur it would not need to concern itself about publicity (that is what it was called in those days) for a hundred years.

Perhaps it is an act of discretion to repeat that the foregoing is not an argument against expenditures for the improvement of veterinary public relations. It is only that the matter be given businesslike, instead of emotional, consideration; that its value be weighed in comparison with what else may be had for the same investment, particularly in such fields as service and ethics.

Antivivisectionists Are Few

In a detailed report appearing in the *Bulletin of the National Society for Medical Research*, May-June, 1949, of a survey to determine the public attitude toward animal experimentation it was shown that 85% of the general population, 95% of high school teachers and 99% of practicing physicians favor the use of live animals in medical teaching and research. Only 1% of those interviewed, report that they have joined groups opposing animal experimentation and only 4% say they have donated money to such organizations. Further, and this seems a paradox, 63% of the general population did not even know that there were any groups opposed to using animals for biological teaching or research purposes.

* * * *

Rabies in 1948

The cases of rabies reported to the Bureau of Animal Industry, USDA during 1948, aggregated 9475. Of these 7331 were in dogs; 628 in cattle; 38 in horses; 16 in sheep; 45 in swine; 538 in cats; five in goats; 857 in miscellaneous animals and 17 in man. The Bureau believes "that the reported cases do not represent all that occurred".

The number reported in 1948 exceed by 529, the number reported in 1947 but falls 1397 below the all time high of the 10,872 reported in 1946.

No rabies was reported in 11 states: Montana, Washington, Nevada, North Dakota, Oregon, South Dakota, Maryland, Massachusetts, Connecticut, New Hampshire and Vermont. Six states: Idaho, Wyoming, Utah, Colorado, Rhode Island and Delaware reported but one case each. Nebraska with two cases and Minnesota with five, raise the area to one-third of the United States which was practically free from the disease or in which the collection of statistics did not include rabies.

This year the mounting incidence of rabies in the states immediately north of the Ohio river, which has been evident for sometime, has taken from the Southern States whatever distinction accrued to being the rabies center of the world. This year Indiana with 1755 cases was first. This state together with Ohio with 629 cases, Kentucky with 743 and Tennessee with 721 definitely established "Rabies Land". Texas reported 1,035 cases. Thus five states reported more than one-half of all the cases. New York with 568 cases, of which 258 were in foxes. ranked sixth among the states in point of numbers. The total number reported in foxes was 568.

In 1885 there were 1739 cases of glanders reported to the State Veterinarian of Kansas (Dr. A. A. Holcombe) from 67 counties. In the same year Dr. James Humphries, Veterinarian, 2d Cavalry U.S.A., died of glanders.

* * * *

According to Dr. Louis H. LaFond, hospital inspector for the American Animal Hospital Association, a reasonable formula for personnel of an adequately staffed animal hospital is: one veterinarian, one receptionist, two kennel men and one night attendant per 50 animals.

* * * *

A recent ruling of the supreme court in Iowa held that the sale of hog cholera virus and serum, except by a registered pharmacist or under his direct supervision, to be unlawful. A bill to permit the Iowa Farm Bureau Federation to continue to sell serum and virus, as it has sold them for many years, was rushed through the state legislature by a vote of 92 to 11 in the house and 40 to 1 in the senate. Being a coöperative the Farm Bureau is exempted from state and federal taxes; further since it supports extension it is authorized to dip in the counties' tax till, and being a powerful political organization it has no difficulty in obtaining exemption from regulatory laws that interfere with profitable merchandising.

* * * *

Rabies in An Imported Dog

Since dogs, imported into the United States, are not subjected to a rabies quarantine, it is common for American publications in the dog field to refer to the British regulations, imposing a six-month quarantine on dogs imported from the United States, as "unsportsman-like." The following quotation from *The Veterinary Record* (April 9, 1949) is illustrative of the necessity for the British quarantine, if Britain is to maintain its freedom from rabies. Over the years the "Record" has contained a number of similar reports of cases of rabies developing during quarantine.

"Since the end of the war there have been eight cases of rabies among dogs imported into Great Britain from abroad. In the latest case the animal, a Bull Terrier bitch, aged five years, appeared to be in normal health upon arrival in this country from Burma on February 8th, 1949. After five weeks in quarantine the dog appeared 'off color,' and symptoms suggesting rabies were seen on the following day. These symptoms became daily more pronounced until the dog died March 22, 1949."

It might be suggested to our dog industry that the control of rabies is not a sport and that British dog owners probably regard it as unsportsman-like on our part to fail to protect our dogs from this painful, fatal disease.

Veterinary Medicine in the South*

By LOUIS LEONPACHER, D.V.M.
Lafayette, Louisiana

WHEN your program committee invited me to speak at this meeting, I considered it a great honor and accepted with pleasure, first, because it is always pleasant to exchange ideas with friendly neighbors and second, because issues are constantly arising which call for open discussion and a coöperative approach by both of our states.

One such issue, which should demand the attention of every veterinarian in the audience, has to do with replacements for the present veterinary personnel in our states and in the nation. The key to this problem is the education of new practitioners for the Southern States. I speak as an individual, not as a representative of any association, nor as the spokesman of any institution of learning. I plead my case as a practitioner and the father of five children, some of whom, I hope will take over where "the old man" leaves off.

Today it is impossible in most of our Southern States for a veterinarian's son or daughter to continue his practice when the time comes that he must relinquish it. The developments of recent years have created a situation wherein a youngster, living in a state in which there is no veterinary college, cannot hope to enter a veterinary school in a normal manner. A year or two ago, I endeavored unsuccessfully to get one of my sons into a veterinary college. I wrote to 16 colleges in the United States and abroad, including LaTrappe, Canada and Paris, France, and I received the uniform reply: "It would be three or four years before new applications could be considered." Many of us remember that only 10 years ago, veterinary medicine was not considered sufficiently attractive to encourage such interest. What caused the sudden change?

First of all, of course, is the "GI Bill of Rights." It is not our premise to evaluate the wisdom of this legislation. The law is a *fait accompli* and will remain an important factor in veterinary education for eight more years, when its privileges expire. But the GI Bill is not a complete explanation of the heavy enrollment. The other reasons given are controversial.

The National Research Council seems to feel that livestock prices and the number of farm animals regulate the demand for veterinary services. I disagree with both theories. In the first place, the price of beef is no satisfactory explanation for the great increase in the number of small animal practitioners and secondly, an increase in the number of cows does not *ipso facto* increase the demand for veterinarians. If this were true, ordinary arithmetic would demand 1,000 veterinarians for Texas instead of the 200 now actual residents in the state.

My contention is that the demand for a product is determined by its quality and usefulness. If the veterinarian can demonstrate that he is worth his keep, the demand for his services will automatically increase. The saturation point is, indeed, away beyond the horizon.

What has this to do with the subject—with veterinary education? A whole lot! If education facilities are expanded and steps are taken to make veterinarians out of all those who have such aspirations, will the large number of new veterinarians find a good livelihood? They will if the present standing of the profession is not only maintained but improved.

The demand for a product is created by its quality. This quality is determined not so much by the type of raw material which goes into it, as by the type of plant which turns out the finished article. When we practitioners go to our state and national meetings, we generally enter a mutual admiration conference, topped by a banquet, where an able speaker assures us that we are just about the grandest thing out. If the meeting is not in a dry state, we are apt to believe it, by the time we knock off for the night.

We are not as good as all that. The progress of veterinary science in the United States during the last 30 years, the period with which I am intimately familiar, was not "hot" at all, it was barely tepid. Let's scan the record, as the late lamented Al Smith was wont to say.

In the Mississippi Delta and in Louisiana we have made a pretty good showing, in anthrax control, but inquiries I get from northern states indicate that our knowledge is, as yet, not theirs. Anaplasmosis was tackled 18 years ago at the United States experiment station in Jeanerette, Louisiana. The progress so far made adds up to, zero minus nothing. We have a reliable vaccine for equine encephalomyelitis, but the etiology of the disease is no clearer than it was 100 years ago. The only progress is a negative one. We know it is infectious to man, but that was a discovery of human medicine. The knowledge about our Louisiana and Mississippi swamp fever is so

*An address at the annual meeting of the Mississippi Veterinary Medical Association, Laurel, January 20th and 21st, 1949.

marginal that in 1936 our peers in Washington neither knew nor would admit there is a supervirulent, hyperacute type of equine infectious anemia. In the South, we observed, 30 years ago, what they learned in the New England States just recently, but neither they nor we know how to cure or to prevent it. The periodic ophthalmia problem is older than the nation; yet the results of all of the study of it can be reported in two words, "no progress."

Our greatest menace today is foot-and-mouth disease. Our livestock sanitary authorities were immensely proud of the United States record with this disease. They had stamped it out repeatedly. How? They knocked all sick and suspects in the head. That's an effective way of stopping any disease perhaps, but can anyone call it veterinary science? A short while ago, our Mexican neighbors pointedly reminded us that the mission of medicine is to cure, not to kill—to conserve not to destroy. Then we had to turn about and do what the scientific veterinarian has always done—resort to prophylaxis. There was no vaccine, there was no place to make it, nor was there the "know how" to make it. We had to call upon Europe and Argentina for help. In hog cholera we cling to a system unchanged in 40 years. Did someone mention progress? Eradication of hog cholera, though possible, is not even considered. Is that progressiveness?

These are veterinary problems of national scope, but take our private headaches: It's the same thing—mediocrity. How good are we in the diagnosis of deficiency disorders? Can you tell copper deficiency from disease due to lack of cobalt? I can't. How good are we on sterility, the most important issue in an ever-expanding dairy industry? I know how good I am; about as good as the Cajun farmer in Southwest Louisiana who added 16 living progeny to the nation's economy, lost one in North Africa and one on the Burma Road, then adopted three more because, as he said, "You know the madame, he likes babies."

How's our official veterinary profession making out? Not so hot. In an age when Great Britain, the Scandinavian countries, and others, have eradicated rabies, our boys in Washington say—of all things—it's not their job because dogs are not livestock. Where were they when Congress was appropriating money for animal disease control? In brucellosis they display enormous effort and pressure, on a program which every practitioner knows is full of holes.

One could continue for an hour to rehearse a list of our shortcomings. It offers a sharp contrast to the performance of the medical profession in the recent war, where they were able to maintain the life of the white man in a subcontinent, which heretofore was considered sure death to the Occidental. This resumé is not an indictment, of our hardworking practitioners, who are more competent and industrious today than ever before. It is an indictment of our leadership, of the plant which turns out the product. The defect lies in education and research. The atomic bomb was not invented by a "GI" in the mud of the trenches. The first uranium pile was not developed at an army post but at the University of Chicago. The objectives of the veterinary profession fall into two groups, scientific development (research and graduate work) and the training of personnel to apply such developments. Scientific facts based upon careful research, are the first essentials in the success of any branch of the medical profession. The greatest shortcoming of our top echelon today is the almost total lack of research, especially in the South. We have some, but the man who replaced the bicycle pump with calcium gluconate was not a native of Louisiana, nor of Mississippi, nor of Texas.

Research goes under the heading of education and the status of our veterinary education in the South will automatically decide whether or not there is going to be any research and what it is going to look like. In turn, the success of our research will determine the importance of the veterinary practitioner, food inspector and teacher in future years. When the savants of our veterinary institutions received a copy of the program of this meeting, I'll wager some of them looked at it twice. "An ordinary horse doctor from way down in the Louisiana marshes talking about veterinary education!" I could hear them say "That's rich." My critics have a good point there.

Why then did I choose to talk? For the utterly simple reason that no one else is discussing this problem, although everyone knows that we are drifting toward an intolerable situation. The salient points of this intolerable situation are as follows:

1. The present enrollment of our colleges amounting to 3489 students, would make for replacement of the total veterinary population in the United States every seven years.

2. This production will, if continued a few years, exceed the demand, unless the market for veterinary services is expanded.

3. This expansion depends on veterinary research opening new fields for veterinary activity.

4. There is little research because there is, for the purpose, neither adequate funds nor personnel.

5. There is no personnel because the educational facilities to train research veterinarians do not exist.

One hits a road block in whatever direction one turns. Various publications have recently made this point very clear. But nowhere have I seen a reaction from those most concerned, from the practitioners—from you and me.

The time has come for us practitioners to put in *our* two-bits worth. What do *you* want?

We want first of all, a voice. In a nation of 150,000,000 Americans, 15,000 veterinarians represent one in 10,000. That is a very small minnow in a very large pond. As long as our democratic form of government is run by the will of the majority, such a small group can never expect to be heard, and we must find a more powerful sponsor and ally.

We have been, and are at present, classified as part of agriculture. If the leaders of American agriculture have done anything for veterinary science, I don't know what it is. This concept of veterinary science being agriculture is utterly out of date. So long as we are only the tolerated stepchild of the various departments of agriculture, we'll never get anywhere. By what sort of logic is the destiny of thousands of highly trained, proficient, small animal practitioners placed into the hands of the B.A.I. who but recently told us the dog is not livestock? A farmer employs a veterinarian, sure! A boilermaker hires an M.D.—but they don't teach welding at Johns Hopkins.

Veterinary science is a branch of the medical sciences. The two professions interlock. Nobody worried much about brucellosis until the undulant fever angle became acute. Animal pathology applied in meat inspection is no branch of farming. It is strictly a human health measure. By no stretch of imagination could any branch of agriculture tackle the rabies problem. It is plainly an assignment for the U. S. Public Health Service, and veterinarians, because of their training in animal disease control, are the ones to implement rabies control.

The point I am trying to drive home is, if we could be reclassified as a part of the public health service of the United States, public support of veterinary education would be easier to obtain. If our official head were a part of a Department of Health instead of a Department of Agriculture our research requirements would command attention.

Very few appreciate that veterinary education in the United States, particularly in the South, is an interstate affair and should be treated as such. Individual states are not allowed to regulate interstate commerce and they should not be permitted to set arbitrary standards for interstate veterinary education. They do, however, and give the simple and potent explanation "we pay for it." Veterinary education not only *is*, but never *can* be anything but an interstate affair for the simple reason that 48 veterinary colleges in 48 states is preposterous. Veterinary education *is* as much interstate as *applied* veterinary medicine always has been. This is the reason why the only federal veterinary authority in the United States, the B.A.I. and the F.D.A. has a grip on the practitioner by controlling the tools with which he works, *viz.* drugs and biologic agents. Important parts of our veterinary set-up having always, by force of necessity, been considered interstate, why do we refuse to consider veterinary education interstate?

I think the reason is very simple. Twenty years ago, there was so little interest in veterinary education that it made no difference who turned out what kind of graduates and when or where. But in the late 1930s, conditions changed, and the interest in veterinary education gained momentum. One factor was the tendency of a modern society, when it attains a high degree of prosperity and comfort, to replace the love for children in a measure by the love for dogs and other small animal pets, which are less expensive to raise and much easier to manage. This created, especially in metropolitan areas, a large demand for small animal specialists. The financial rewards of small animal practice more than offset the losses occasioned by a decrease in equine practice, consequent upon the advent of the automobile and the tractor. Another factor: The prestige of veterinary medicine was advanced by the splendid record made by the 2200 veterinarians who served in the army during the war. It was further enhanced when thousands of others were exempted from military service because of being essential to food production. When Franklin D. Roosevelt gave us an extra tire during rationing, our profession was suddenly propelled into the limelight and with the termination of the war the gold rush was on.

Today, four years later, the question demanding an immediate answer is: How shall we educate the future veterinarian and where? We know that we do not now have what it takes, how are we going to get it?

Four proposals deserve consideration: (1) Nationalization of veterinary education. (2) Subsidy to existing institutions. (3) New colleges. (4) Regional education.

(1) *Nationalization.*—This is a proposal which has the soundest foundation and the

least hope of success. When nationalization is mentioned to an American, he gets the jitters, he thinks of collective farms in Russia, of nationalized coal mines in England, of confiscated oil properties in Mexico and Hitler youth in Germany, so it may as well be dropped. Personally, I am fond of the idea. I was educated under this system and in almost 60 years have not found anything wrong with it. The truth is we *have* nationalization, but we give it a different name. West Point and Annapolis are nationalized institutions of learning. The projected Air Force college will be another.

(2) *Subsidized State Schools.*—This plan is discussed in the February issue of VETERINARY MEDICINE page xxiii as "regional education," which is a misnomer. This proposal seems to have the widest appeal. Personally, I think it no good. Subsidy means for us that Georgia, Alabama, Texas or Oklahoma would admit a certain number of students from Mississippi, Louisiana, Arkansas, Tennessee, Florida, North Carolina, South Carolina, Virginia or Kentucky in return for a specified amount of money. It's a makeshift arrangement which may work for a while—I don't think it will last; the psychology is wrong. The plan is open to the following objections:

a. How would a figure be arrived at, which correctly compensates the host state for funds already expended? *e.g.* educational plants, etc.

b. The state with the college would certainly not turn over its enrollment or control. If it doesn't, who is to decide policy matters and employment of personnel?

c. I discussed this plan with the dean of the Athens College who informed me that his lawyers had certain apprehensions. They took the position that a state entering a contract to turn out a veterinarian from a student assigned to it by a neighboring state for a certain amount of money, may find itself in a position where performance was impracticable or even impossible. Would it be a money-back guarantee?

As a matter of record it may be mentioned that Louisiana spends about $350,000 per annum for the education of negro students enrolled in out-of-state colleges.

d. What about out of state fees? In certain colleges, they are so high for out-of-state residents that a student has to pay more than a dollar a day penalty for being born in the wrong state.

e. Even though one state is willing to pay another state for the education of a given number of veterinary students, it is unlikely that state legislatures would appropriate large sums to be used for research in another state. And, as pointed out previously, research is paramount to our veterinary future.

(3) *New Colleges.*—There are at present 10 approved veterinary colleges, and seven in the making, in the United States and two in Canada. There is talk of more. In the 1948 gubernatorial campaign in Louisiana, the establishment of a new veterinary college was one of the planks in the platform of the successful candidate. The cry for new colleges stems directly from what is known as the "native son policy" not from a demonstrated need for veterinarians. "Native son policy" refers to the practice of colleges of accepting for enrollment only citizens of the state in which the college is located.

In 1942, I discussed this, then new policy, with the veterinary dean in Manhattan, Kansas. His statement: "It costs the State of Kansas, not a very rich state, $14,000 to educate a veterinarian," which I presume includes physical plant, etc. "Do you think" the dean continued, "it is fair to charge the Kansas taxpayer with $14,000 to pay for the education of a Louisiana boy?" I said the answer is "No, but dean, let *me* ask *you* one! If there are in Louisiana many good locations where a competent veterinarian can earn a good living, do you think that only a Kansan should practice in Louisiana?" He did not answer that one, but we practitioners of Mississippi and Louisiana will *have* to answer it. What is your idea, gentlemen?

To me new colleges are the poorest solution we could find in the South.

First of all, we would just add another native son college and if driven to its ultimate conclusion, we would end up with 48—an absurdity.

Secondly, our present veterinary institutions are unable to secure adequate personnel for their training staffs. Whence will the new colleges be staffed?

Thirdly: If our approved colleges tell us there is no trained veterinarian available for the absolutely necessary research, the shortage will be worse in the new schools and no research will be forthcoming.

Fourthly: If a new state college has any considerable enrollment, it will turn out 15-25 graduates or more, each year. The 1949 prospect is 68½ graduates per college. Since the 15 or more would be native sons, it is more than likely that most of them would choose to remain native sons and stay in their home states. A crop of 20 to 25 graduates per year would double the veterinary population of Louisiana in five years.

Fifthly: Today's enrollment of 2992 in approved schools will, if continued, overcome the current shortage of veterinarians in a few years. When the already established, but not yet approved new veterinary schools add their expected 497 graduates, there will be keen competition. But if still more schools are added, the time will soon come when these schools will compete with each other for students, which cannot but lower the standards of our institutions and with it, the standard of our profession.

The mortality of veterinarians is not extra high. They belong strictly in the "durable goods" class.

This is just one more reason why a proper balance must be struck between supply and demand.

(4) *Regional Education.*—A year or two ago a colored woman in Oklahoma set out to get into her state's white university. When Oklahoma reacted in the traditional way of the South, the case reached the United States Supreme Court which reacted in the way the United States Supreme Court always has and always will react on such a question of human rights. Regardless of the popular reaction in southern corner drug stores, the competent and thoughtful leaders of our Southern States knew when they were licked. Yielding to the United States Constitution, the governors of the Southern States, meeting in Waukulla, Florida, created a new idea which should give the black man his constitutional rights, and which at the same time protects a southern policy which has prevailed through three-quarters of a century. The term regional education came into being.

The case of the southern veterinarian is almost identical in its technical aspects with that of the Shipley woman of Oklahoma. I believe the plan for a regional veterinary education in the South comes closer to meeting all objections than any other plan proposed. The regional plan would mean establishment of a school by three or four states that are without colleges. The participation in such a school would be on strictly equal terms. The trustees or regents would consist of equal numbers from each state, the enrollment would be equally divided, the expenses would be shared equally, and the combined resources of a number of states with or without federal participation would ensure such a dominating status for the institution that research activity could easily be implemented.

An outstanding advantage of the scheme would be that it would be non-political by virtue of its anatomy.

An immense benefit would be that, being a southern institution, the problems receiving the most study would be the headaches of the southern veterinarians, there are plenty with strictly southern flavor: swamp fever, sweet potato poison, deficiency diseases, anaplasmosis, liver flukes, etc. I have in the back of my head a long list of jobs that would keep a good research man from getting bored from now on, *e.g.* (1) foamy bloat. The recent discovery that wetting agents break surface tension promises fundamental relief. (2) Photosensitivity. Why does phenothiazine blind some cattle and not others? (3) Antrycide. Does the recent success of the British in trypanosomiasis promise success in other protozoan diseases, *e.g.* anaplasmosis? (4) An intravenous approach against botryomycosis, misunderstood by plenty of southern veterinarians, *Mal de lac,* foot evil, *Mal de mer,* dew poison. (5) Fungus therapy. Selective radiation found effective in packing plants. (6) Time limitations of successful topical application of sulfa drugs. (7) Advantages of keeping surgical subjects in dehumidified quarters, chilled to near freezing by air conditioning, to inhibit bacterial immigration. I have plenty more.

Returning to regional education. The annual crop of graduates from such a school would take care of replacement demand, plus new development. Next, the establishment of a powerful research center on the Gulf Coast would mean a testing station with subtropical climate, a condition no other part of the United States can duplicate. Those of you who specialize in infectious disease control, know that the study of heat, light, humidity, and other important components of our atmosphere are of supreme importance to the veterinarian. Up north they put Petri plates into an incubator, in South Louisiana or Florida a thermometer placed in the irrigation water of a rice field registers 102.6° F. anytime. Our incubators are 100,000 acres in extent.

The cost of the establishment should not be prohibitive if the federal government would assist by giving us one of its experiment stations. There are some, in the strictly pork-barrel class, that would furnish us with what we need. Of course, the political scientists will point out that a pork-barrel is a necessary receptacle in a true democracy. I admit it, but counter with the suggestion that an agricultural station diverted to the study of diseases of livestock would still render enough lard to satisfy the law makers and it would overcome one of our troubles.

Coming to the personnel issue: One reason why veterinary teachers are harder to find than other teachers is this: When a veterinary instructor's pay is not enough, he goes

into practice and makes more. A teacher of philosophy can't do that.

A college supported by the resources of several states should be able to pay the salaries required to insure the hiring of top flight scientists.

I have at times discussed these issues with persons better informed in the premises than myself. The inability to find instructors seemed to be their main stumbling block. Personally, I cannot see that it is as bad as they make it. One remedy is to divorce veterinary science from agriculture. If our agricultural colleges should lose their veterinary instructors it would close a large number of veterinary quack factories and at the same time free, for strictly veterinary science, a large reservoir of highly trained veterinary teaching personnel of the highest type and proved ability. As an additional advantage it would increase the demand for veterinary service as the agricultural graduate would then be more inclined to stay on his side of the fence.

If you, my fellow veterinarians, think the points I have tried to bring out deserve consideration, it will be your job to work for their realization. The organizations whose duty it is to implement our ideas or whose support we have to solicit are:

1. The A.V.M.A. which can represent your interest only if it is made fully aware of your position in the issue. If you express yourself in your state meeting, the echo will be heard in the national body.

2. The United States Livestock Sanitary Association, a sort of self-styled sanitary law maker is by virtue of its composition a political body and therefore occasionally motivated by political expedience. But since practically all veterinarians in official and regulatory positions are members we have an opportunity to make our wishes known through our own livestock state officers.

3. The National Research Council would be of immense value if the members of this austere society can be induced to lower their well-trained ears to the level of the dirt farmer of our profession—the practitioner.

4. There is one national forum to which I would rather submit our disputes than any other, and that is the Association of Federal Land Grant Colleges and Universities. I feel this body would be the first to fully appreciate the interstate character of veterinary education, and that it would be the first to consider relief of our difficulties on account of its federal charter.

When the issue is removed from the atmosphere of academic discussion and enters the arena of practical state politics, the start has to be made with the state legislator. It is your job to sell him on the necessity of research, the benefit of scientific livestock disease control, the interchangeability of human medical and veterinary problems and the importance of the veterinarian as a guardian of human as well as animal health. But don't call yourself agriculture, a farmer would not give you two bits for a dog. If you want to interest a farmer legislator in the dog, wait until he is bitten by a mad one, and he'll pass any kind of law, appropriate any kind of money, and hire any kind of personnel suggested.

We are now experiencing the growing pains of a progressive profession. It's growing and it's progressive. It is your job and mine to keep it progressive. The men of my generation, from those 10 years my senior to those 10 years younger than I, have made the veterinary profession of the South what it is today. When I began practice in my town, nearly 30 years ago, I introduced myself to a prospective client as a veterinarian. He said: "You know, I was in the war too. He had never heard the word 'veterinarian'." Not long ago one of my boys told a classmate his dad was a veterinarian and the shocked youngster replied, "You mean your old man don't eat no meat at all?"

Our job in this section of our nation was to convert the doctoring of horses into a scientific profession. It was not easy, but we made a pretty good job of it. You younger men don't have to worry about that any more, but you have new problems and they also are tough. You not only have to maintain the standards which we, your predecessors, attained, but you must advance veterinary knowledge, tackle new problems and find the solution for plenty of old ones which we were unable to conquer.

The key which will open all doors, is advanced, enlightened, and progressive veterinary education in the South.

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At a meeting of the Japan Veterinary Scientific Society in Tokyo April 10 and 11, 1949, 108 papers were presented or read by title. The next meeting will be held in conjunction with the J.V.M.A. and will be held in sections to allow time for discussion of the papers.

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To improve the quality of whale meat the [British] Minister of Agriculture and Fisheries has issued a new code of rules, stating that a veterinary surgeon and two meat inspectors have to be included in the company of every whaling factory ship. Their duties are to watch over the killing of whales, inspect the meat at every stage of its preparation, and certify that it conforms to the hygienic conditions laid down.—*Vet. Rec.* London.

The Progress of Veterinary Medicine Dependent on International Congresses

By D. C. HOMAN, Dr. Med. Vet.
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THE bicentennial of the foundation of the first veterinary college, (Lyon, France, 1761), will be celebrated soon. Shortly after this college was founded, other veterinary colleges were established in every important country of Europe and in many other parts of the world. Notwithstanding this long existence of veterinary colleges, there is little information available about the instruction given in them in different parts of the world, the pedagogic methods in use or the general character of their work. Various data could be cited to prove this statement but only one, the newest, need be given.

The subcommittee of the committee on Animal Health of FAO (Food and Agriculture Organization of UN) when it met in Washington, April 1947, discussed the teaching of veterinary medicine. It did not possess, however, the necessary information and could not reach any conclusion about the students of veterinary medicine and the world's need for veterinarians. It was decided to collect this information to enable the FAO to continue the work of planning an adequate food supply for all peoples.

The want of knowledge of the veterinary instruction in the world is caused by the lack of comparable, regular reports on this matter by all the veterinary colleges. Only two books, concerning the veterinary education in the U.S.A. and Europe have been published. Bressou, dean of the National School of Veterinary Medicine, Alfort, France, wrote one of them giving full information concerning veterinary education in Europe shortly before the beginning of World War II. Today a good deal of this information is already obsolete and does not give an accurate picture of the present situation. Veterinary education in U.S.A. was rather briefly described by Merillat and Campbell in the "Veterinary Military History of the United States." Many veterinary journals all over the world, however, failed to review either of these books and hence most veterinarians know little or nothing of the veterinary education in the Americas or in Europe, or in any other part of the world, except in the country in which they live.

What is known about the actual organization of the veterinary service in various countries? For example: how many veterinarians are in each nation? How many domestic animals are there to each veterinarian? How many veterinarians are practitioners? How many are food inspectors, research workers, teachers, or in other branches of veterinary medicine? How many veterinarians are needed in the world?

The answers to these questions are, in most cases, quite inadequate. Only a couple of advanced nations have collected these statistics. This information, however, is not gathered systematically and regularly, thus does not always give an up-to-date picture of the actual state. As a proof, it may be noted that Dr. H. L. Foust could not obtain present statistics as to the distribution of veterinarians in the U.S.A. and was forced to use in his report to the 83rd annual meeting of the A.V.M.A. (August 1946) data that was already four years old. These four-year-old American statistics he compared with German statistics which were ten years older.

The poor knowledge about the veterinary service in the world is emphasized by the action of the veterinary subcommittee of FAO which, realizing the lack of the information on this matter, concluded at a meeting in London (April, 1947) to gather this information for all nations. Now, for the first time in the history of veterinary medicine, a uniform report on the actual situation of the veterinary service and the veterinary profession in the whole world is in preparation.

It is very interesting to turn the leaves of the veterinary journals from various countries. Here, better than anywhere else, one can see that important improvements and discoveries in different branches of the veterinary medicine in a country remain unknown in many others. Often it is years before they become world-wide knowledge.

To cite an example from veterinary practice to which attention has been called recently in VETERINARY MEDICINE:

In Greece, hepatic distomiasis in sheep *(Distomum hepaticum* and *Dicrocoelium dendriticum)* causes considerable economic loss. The Greek veterinarians have used against these parasites, carbon tetrachloride, which is effective—as it is well known—against neither the young forms of the large fluke *(D. hepaticum)* nor against the small one *(Dic. dendriticum)*. This was the experience of the Greek veterinarians too, but they continued to

use carbon tetrachloride, due to the lack of knowledge of a better medicament. Following the end of World War II, UNRRA supplied Greece with large amounts of hexachloroethane for the treatment of fluke diseases. Martin M. Kaplan, V.M.D., chief of the UNRRA veterinary mission in Greece and Sotirios Sakellarion, Greek veterinarian, have proved by experiments that hexacholoroethane is highly effective against the small fluke and the young form of the large fluke in sheep. The Greek veterinarians were much pleased to have this new and more effective remedy with which to fight the fluke.

Before the beginning of World War II, however, an effective treatment for hepatic distomiasis in sheep was discovered in Turkey. C. S. Sprehn proved an antimonial compound (two injections of 20cc intramuscularly) kills all small flukes. The Greeks ignored this discovery of its neighbor. The lack of knowledge about hexachloroethane continues in many other countries which still use the old and less effective remedies against distomiasis.

Another example: the veterinary college in Vienna (Austria), always considered as a center of the veterinary medicine for the Middle and Southeast Europe, more than a year after the end of World War II, knew nothing of the use of penicillin in veterinary medicine. Some time later it was able only to demonstrate it to students and to use it sparingly in experiments. Austrian veterinarians, however, have not yet been informed by their national veterinary journal about the use of penicillin in the treatment of animals. The same lack of knowledge and use of penicillin in veterinary medicine could be observed in most of the European countries behind the "iron curtain."

In veterinary research similar examples could be cited. Knowledge of the production of the new avianized and lapinized rinderpest vaccine made in the U.S.A. during the late war, is not yet spread over the world. How many veterinarians are informed about the successful transplantation of ovaries done by the American veterinarian, Dr. L. F. Whitney? How many veterinarians are acquainted with the newer sulfa drugs, DDT, gammexane and so on? Continental European veterinarians know little concerning the foregoing and many other developments which are more or less familiar to veterinarians in the U.S.A., Canada, Australia, etc. This can be excused by the war and postwar conditions but veterinarians in South America, in Asia and in Africa are even less informed on the actual progress of veterinary medicine.

In Chile I had a lot of trouble to find the veterinary journals from U.S.A. and Europe. The librarian of a veterinary institution where I made inquiry told me he received only the *J. Am. Vet. Med. Assn.*, but the latest number he had was the May issue of 1942, and this was in December 1948! The veterinarians in this country are getting news about the progress in veterinary medicine only from their national veterinary journal published once every two years of about 20 pages. When such a situation exists in Chile, being considered as one of the more progressive nations of South America, under what conditions do the veterinarians in less progressive countries of this continent do their work[1]?

First-hand information about the situation in Africa and Asia does not exist.[2]

It is evident the cases mentioned in the foregoing from veterinary instruction, general practice, veterinary research, and the organization of veterinary service hinder not only the progress of veterinary medicine, but also the advance of public health and the national economy.

The obligation of all conscientious veterinarians, all over the world, is to put aside this lack of mutual exchange of ideas and experiences, which exists in veterinary medicine. The problem is how this can be done most efficaciously?

It is not difficult to indicate the solution of this problem if one makes a short analysis of the work done by the international veterinary congresses.

From 1863 to 1938, 13 international veterinary congresses convened and discussed 19 branches of veterinary medicine, including many important problems. The programs of these congresses have included the following branches of veterinary medicine:

1. *Infectious Diseases* occasioned the convocation of the first International Veterinary Congress in Hamburg, 1863. Rinderpest was spreading all over Europe and threatening the destruction of the cattle industry. European

1. *Editor's note.*—The author here makes the common error of projecting his experience far beyond the horizon of that experience. He has but lately arrived in Chile from behind the "iron curtain." Veterinarians in the Latin American republics are largely confined to the large cities, particularly to the capitals. Excellent veterinary colleges exist in several of them and at least three quarterly veterinary magazines that compare favorably with any published elsewhere, keep their readers informed of advances in veterinary science. Foreign veterinary magazines are read in those countries too. VETERINARY MEDICINE has subscribers in every Latin American Republic; 121 in the aggregate and an appreciable number in the West Indies. In Chile from which the author writes, there are 13 subscribers to VETERINARY MEDICINE, nine in Santiago, and one each in four other cities.

2. In this the author writes from his experience behind the "iron curtain." Surely in every western country the fine records of the veterinary service of South Africa and of Egypt are known. Readers of this magazine know something of the veterinary service in the French, Belgian and other African colonies and proctectorates. In the "Dark Continent" there are more than 100 subscribers to *VETERINARY MEDICINE.*

veterinarians met at the call of Professor John Gamgee to discuss measures for combating this infection. The two following congresses (Vienna 1865 and Zurich 1867) and the 11th Congress (London 1930) reported on this disease. Tuberculosis has been on the program nine times, and foot-and-mouth disease, contagious pleuropneumonia of cattle, and hog cholera nearly as often. Reports on gas edema diseases and anthrax were discussed at three congresses and contagious abortion, variola, glanders, paratyphoid diseases and psittacosis were on the programs of two meetings. In recent congresses pseudo-rabies, infectious equine anemia, contagious equine pneumonia, distemper, influenza, malignant catarrhal fever, enzootic encephalomyelitis, coccidiosis and streptococcic diseases of domestic animals have been considered.

Rabies was on the agenda of five congresses. Due to its importance in the veterinary and human medicine, it was discussed in a separate section. It was the principal item for consideration at the second congress (1865). A report on filterable viruses was read at the 11th congress.

> **"Other hounds flee and avoid the wood [rabid] hound as pestilence and venom, and he is always exiled as it were an outlaw, and goeth along wagging and rolling as a drunken beast, and runneth yawning and his tongue hangeth out, and his mouth drivelleth and foameth, and his eyes be overturned and reared, and his ears lie backward, and his tail is wrinkled by the legs and thighs; and though his eyes be open yet he stumbleth and spurneth against everything, and barketh at his own shadow."**
> **—*Barthol. Glanville,* c. 1250 A.D.**

The consideration of infectious diseases at these congresses explored the field fully, including history of the origin, development, extension, diagnostic tests, prophylaxis and treatment.

Organization of a veterinary service was on the program of nearly all congresses. The propositions included a better organization of national and international veterinary service, and problems concerning international trade in livestock, veterinary vital statistics, insurance of domestic animals, manufacture of biological products and the dispensing of remedies. Other matters considered concerning this branch of veterinary medicine were: Veterinary employees, coöperation of veterinary and human medicine, and the international veterinary congresses. At the last congress, (1938) two papers on the veterinary service in wartime were read.

Food hygiene reports were submitted at nine congresses. Meat inspection, modern slaughtering of animals, the relation of veterinary medicine to public health in the matter of the consumption of meat, the sale of food of animal origin, and the classification of meat of tuberculous animals were questions discussed.

Veterinary instruction was on the agenda of more than one-half of all the congresses. The third congress was the first to deal with veterinary instruction and to endorse propositions for its improvement. Later, special attention was given to the doctorate degree in veterinary medicine and to the instruction on animal breeding that a veterinary student should get.

Veterinary legislation has been on the program of six congresses. The following questions were discussed: Legal protection of veterinary service, communicable diseases, animal deficiency, veterinary police regulations and veterinary police in colonies.

Various actual problems of *internal medicine, tropical diseases, milk hygiene,* and *animal breeding* were among the reports of the last five congresses. The greater number of reports related to animal breeding and a resolution declaring the veterinarian to be the only competent expert in this branch of veterinary medicine, was accepted.

Parasitology and parasitic diseases, poultry diseases, obstetrics and veterinary research were the parts of the program of four congresses. The first included the toxic substances produced by parasites, treatment of parasitic diseases, immunity against parasites, the parasites in wild animals, parasitic diseases in India, and parasitic diseases transmitted from animals to man.

Blackhead, bacillary white diarrhea, fowl plague, fowl pox, coryza, leucemia, tuberculosis, lymphomatosis and neurolymphomatosis were discussed in the section on poultry diseases.

The necessity of establishing laboratories for the veterinary research, a proposal to make a list of accepted names of the diseases of domestic animals, a report on the significance of veterinary science to the public health, the publication of scientific papers were among the general problems of veterinary research work. Most of the discussions of parasitology, poultry diseases, obstetrics, and veterinary research have been at congresses since World War I.

Physiology discussions included, physiology of inheritance, the physiological basis of feeding, physiology of the rumen, physiology of the udder, gonadotropic hormones and the blood-group studies in domestic animals.

Veterinary Hygiene has been on the agenda of three congresses. The discussions included the hygiene of pasture, stable hygiene and the disposal of cadavers and condemned meat.

Surgical problems were considered at two congresses.

Hemostasis in the modern castration, chronic arthritis in horses, the recent progress of veterinary surgery, and the present status of anesthesia were among the reports submitted. At the last congress surgical demonstrations were organized. The use of *x*-ray in veterinary diagnosis and treatment was discussed at the last two congresses.

Finally, papers on *veterinary nomenclature for anatomy* have been presented at meetings.

This tremendous volume of work of the international veterinary congresses was accomplished during 87 general and 114 sectional meetings which, altogether, lasted about 600 hours. More than 1500 veterinarians, the leading specialists in various branches of veterinary medicine, reported on all problems and took part in the discussion.

At the second congress, Professor Fuchs of Baden, Germany, proposed that a review of the influences the congressional work has on the progress of veterinary medicine should be given regularly at the beginning of each congress. This proposition did not prevail; hence no official summary of this influence exists. However, the following facts are common knowledge:

1. Only the international veterinary congresses call together veterinarians from all parts of the world in such numbers to discuss our professional problems.

2. Each member has a wonderful opportunity to be instructed by the famous research workers on the actual status of veterinary medicine.

3. The knowledge gathered during these meetings is spread all over the world. Every modern nation to a greater or lesser extent, applies the congressional recommendations for the regulation of its veterinary service. The work of the international veterinary congresses thus has a favorable effect on the general development and progress of veterinary medicine.

In view of all this, it is easy to solve the problem of how the lack of mutual exchange of ideas and experiences in veterinary medicine as well as the consequences caused by this situation could be overcome most efficaciously.

The solution is *regular convocations of international veterinary congresses.*

Veterinarians all over the world were pleased to hear of the first official steps toward the convocation of the 14th International Veterinary Congress which were initiated shortly after the end of the war by Dr. John R. Mohler, vice-president of the Permanent Committee of the International Veterinary Congress, at the conference on resumption of international congresses and conferences of the National Research Council in Washington, April 1946. At that conference, he pointed out the need of collaboration of American and British veterinarians to organize the 14th International Veterinary Congress. In August 1946 at the conference of Food and Agricultural Organization in London, the veterinary delegates from the United States, the United Kingdom, France, South Africa, Iran, India and Brazil, examined the possibilities of holding this congress. The subcommittee on Animal Health of FAO, when it met in Washington in April 1947, had a special meeting in the office of Dr. B. T. Simms to discuss the holding of the next congress. Switzerland was proposed as the most convenient place for this international gathering, but the final decision was left until the next conference at the Office International des Epizooties in Paris, May 1947. At this conference, it was decided to hold the 14th International Veterinary Congress in London in August 1949.

Thus, veterinarians will hold an international meeting four years after the end of World War II and will not wait, as happened after World War I, 12 years for their first postwar international meeting.

The 14th International Veterinary Congress being the first postwar meeting has a special importance, since it may canvas old problems which may get a new solution by the progress of medicine. The whole development in veterinary science from the last congress in 1938 until today should be on the agenda.

The 14th International Veterinary Congress will renew international collaboration among veterinarians, contribute to the mutual exchange of ideas, spread recent advances in knowledge all over the world, clear up scientific and practical veterinary problems, and aid in their solution on the basis of modern science.

It will lessen the lack of information mentioned in the first part of this paper, and become a new warrant of the development and progress of veterinary medicine and the veterinary profession throughout the world.

Comments Upon Animal Health Factors

By R. R. DYKSTRA, D.V.M., Manhattan, Kansas

If swine are fed raw milk derived from cows that are infected with *Brucella suis*, the chances are that the swine will contract brucellosis. Milk of this kind can be made safe by pasteurization — 143° F. maintained for 30 minutes.

Agitation, and containers incompletely filled with diluted bull semen decrease the viability of the spermatozoa. Therefor in the shipment and handling of diluted bull semen—the diluter used being the customary egg yolk-citrate mixture—the test-tube container should be completely filled, and every possible precaution taken to limit agitation to a minimum.

Boddie (*Vet. Rec.* Feb. 19, 1949) states, that at the Royal (Dick) Veterinary College in the clinical handling of milk fever in those cases "in which there was virtually no response to the parenteral injection of calcium borogluconate but there was an immediate prompt and dramatic response to udder inflation carried out some hours after the injection of calcium." The author emphasizes the necessity for the most rigid aseptsis during inflation.

English veterinarians have had to contend with a horse disease designated "blue nose." The characteristic symptoms are edema of the muzzle, and bluish discoloration of unpigmented skin. A biting mania, circling, and pressing against fixed objects, with edema of the legs have also been observed. "Anaphylaxis photosensitization" has been suggested from the standpoint of etiology. Adrenalin chloride solution in repeated 5cc doses seemed helpful.

In the March 16, 1949, *Proceedings of the Staff Meetings of the Mayo Clinic*, it is recorded that in their experience in the clinical handling of brucellosis in persons the best results have followed the combined oral administration of aureomycin and the intramuscular use of dihydrostreptomycin. "For acute brucellosis the average course of treatment should be 12 to 14 days. In the treatment of culturally proved brucellosis with localizing lesions (brucellosis with complications) the course of treatment probably should be extended to from 21 to 28 days." Amongst others, there's hope in this message for those veterinarians that in their practices or otherwise have contracted this serious infection. (Medical dictionaries define dihydrostreptomycin as "a derivative of streptomycin said to be more stable than the latter.")

McClure (*J. Am. Med. Assn.* Mch. 12, 1949) in an article about fluorine states that "Any increase of fluorine in cows' milk due to extra fluorine in the cows' ration or drinking water is not to be expected, contrary to some such suggestions. All the evidence reveals no elevation of fluorine in cows' milk due to additional fluorine in the ration or drinking water."

Combined sulfonamide therapy *per os* is meeting with increased favor by practitioners because of the larger total dosage permitted without the danger of a corresponding increase of intrarenal precipitation. This therapy is based on the fact that when two different sulfonamides are given simultaneously, each exerts an independent action. Thus a comparatively small dosage of each, though this makes a large dose of the combination, is without the dangers attending large doses of either. Nevertheless, use fluids liberally in the sulfa-treated animal.

In the tropics physicians advise against intravenous medication when the oral route is likely to be as effective. The danger of transmitting blood infections is always a hazard, when amongst other conditions, sterilization of needles and syringes is inadequate. Veterinarians have learned the same lesson—especially in anaplasmosis transmission and others—because of the large number of venipunctures they must make for diagnostic purposes.

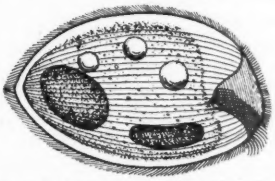
Heredity in the prevention of animal ailments is still a good deal of a mystery. Hernia in pigs and bulldog calves are, for example, definitely of a heritable nature or these conditions can be dealt with on a simple genetic basis. Other conditions in horses that cannot be ascribed to a single gene, or in other words, that are of the multiple factor type, include bone conditions such as ringbone and spavin, navicular arthritis, ossification of the lateral cartilages, laryngeal hemiplegia, cataract—usually as a sequel of periodic ophthalmia, shivering, stringhalt, defective genitalia and others.

Notes on Veterinary Parasitology

By A. O. FOSTER, Ph.D., Beltsville, Maryland

Balantidium Coli of Man and Pigs

In a concerted experimental attempt, investigators in Portugal were unable to transmit *Balantidium coli* from pigs to six human volunteers[1]. Presumably to prove the susceptibility of the volunteers to protozoa of human origin, four of them were successfully infected later with *Trichomonas hominis*.



***Balantidium coli* (genus of ciliated *Infusoria*); after *Leuckart*. A protozoa occurring in the large intestine which may be mistaken for a parasite egg.**

Trichomoniasis Control

A specific hygienic breeding program upon which veterinary practitioners and cattlemen may rely for the systematic elimination of bovine venereal trichomoniasis from infected herds has been described by Bartlett and Dikmans.[2] Probably there are few specialists in this field whose attention has not been directed to their report. It is scientific, but very practical; informative and concise. Indeed, it is doubtful that better discussions have been written on this difficult and important disease. It is certain that none contains more pertinent suggestions for eradication.

A Phenothiazine-Salt Reminder

If sheep parasites become unexpectedly troublesome this summer or fall, as they almost certainly will in many flocks, years of reliance upon the free-choice administration of phenothiazine in salt may provide a clue to the disturbance. When there are fewer than average losses from internal parasites, stockmen sometimes become forgetful of these hidden pests. Relaxation of control measures inevitably follows. An experiment at the Agricultural Research Center, USDA, described in the last annual report (p. 65) of the Chief of the Bureau of Animal Industry, revealed that interruption or discontinuance of the regimen may lead to serious trouble. Moreover, the literature contains much evidence of the development, by sheep, of a protective immunity to internal parasites. Therefore, it might be considered adequate, when one has an essentially "closed" flock, to employ the free-choice regimen only so long as is necessary to permit an immunity to be engendered by the residual parasitism that persists under the regimen. Indeed, it was chiefly because there was no information on this point that the aforementioned experiment was carried out. After five years of effective control of parasites with the free-choice regimen, the measure was deliberately discontinued. The flock consisted of about 50 ewes. Within a 165 day lapse thereafter, several sheep developed clinical parasitism and one died of acute stomachworm infestation. Furthermore, the experiment showed that satisfactory control was not reëstablished by resumption of the free-choice regimen but was achieved only after therapeutic doses of phenothiazine had been given to the whole flock.

Arsenic-Resistant Trypanosomes

The term "arsenic-resistance" which has been commonly employed in reference to trypanosomes that are resistant to medication with atoxyl, tryparsamide, mapharside, and other aromatic arsenicals, has been recognized as a misnomer for many years. It appears to have been none other than Ehrlich himself who showed that atoxyl-resistant trypanosomes were sensitive to arsenophenylglycine. Other investigators have shown that they are also sensitive to certain other aromatic arsenicals containing an acetic acid or carboxyl substituent in the non-arsenical phenyl radical. More recently, tryparasamide-resistant trypanosomes have been found to be sensitive to such arsenicals as Eagle's compound, 4-(p-arsenosophenyl) butyric acid, and Melarsen oxide. Experimental data of this nature have led investigators to the conclusion that the presence or absence of arsenic in the molecule does not determine activity against so-called "arsenic-resistant" trypanosomes, but, rather, that whether or not a compound is active against such forms depends upon the nature of the substituted grouping in the non-arsenical phenyl radical.

[1]Trincao, C. and Pitta Simoes, J. M. *Ann. Inst. Med. Trop.* 4:161-163. 1947.
[2]*Am. Jour. Res.*, 10(34) 10:30-38. (Jan.), 1949.

Johne's Disease in the United States*

By A. B. LARSEN, D.V.M.
and A. H. GROTH, B.S., M.S., D.V.M.
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JOHNE'S disease (paratuberculosis) is a chronic infectious disease of cattle, occasionally of sheep and goats, characterized by inflammation of the intestines and a recurrent diarrhea that may persist for months. There is a gradual loss of condition, even though the appetite may remain good. The disease is quite prevalent in Western European countries and the British Isles, where intensive dairying is practiced. Since accurate information on its extent in the United States was lacking, an attempt has been made to determine the distribution. The Tuberculosis Eradication Division, Bureau of Animal Industry, U. S. Department of Agriculture coöperated in acquiring some of the information[7]. In three widely separated Alabama counties 18,357 cattle in 312 herds were tested intradermally with johnin. Of these cattle, 0.5% in 38 herds reacted to the test. The rest of the information was gathered from the files of regulatory officials, diagnostic laboratories, published reports[1, 2, 5, 6] on Johne's disease and by members of the staff of the Regional Animal Disease Research Laboratory[7] during the course of experimental work on it.

The distribution of the disease nationally is shown on the map (figure 1). The shaded areas represent counties in which Johne's disease has been diagnosed in one or more herds of cattle. This information is not all current, but has been gathered over a period of years. It shows where Johne's disease either exists at present, or has existed in the past. Probably there are other herds in which the disease exists, but they have not been called to the attention of regulatory officials. It is evident from the map, that Johne's disease is widely distributed in this country.

The annual death loss in infected herds may be as high as 10% of the adult animals. However, in the majority of the infected herds this annual loss may not be over 3%. It is in such herds where the losses are not great, that little effort is made to control the disease. Unfortunately many of these are purebred herds from which animals are sold for breeding purposes, thus gradually spreading the disease to other herds.

It is possible that Johne's disease may become as prevalent and troublesome in the United States as it is in certain parts of Europe, unless more attention is given to its diagnosis and control. Veterinarians should become familiar with the disease so that they will be in a position to make a correct diagnosis should it be brought to their attention by their clients.

The cause of Johne's disease is a small, rod-shaped, acid-fast bacillus, *Mycobacterium paratuberculosis*. Since the organism attacks the intestinal mucosa, large numbers may be present in the feces of diseased animals, and it is generally believed this is the principle source of infection. Susceptible animals are infected by coming in contact with the feces of a diseased animal. Because Johne's disease usually spreads slowly, it is unusual to find a high percentage of a herd infected. The incubation period may range from several months to several years. In controlled experiments at the Regional Laboratory the shortest incubation period was 15 months.

Symptoms[2] of the disease usually appear in animals two to six years of age, often shortly after parturition. The first clinical symptom is a chronic intermittent diarrhea without straining. There is a general unthriftiness, with a rough hair coat and a dry skin. The appetite is good, and the temperature and pulse are normal. Later the appetite fails and the animal refuses all feed. The infected animal continues to scour and waste away until it becomes extremely emaciated and eventually dies. Occasionally an animal may show temporary improvement for a few days only to start scouring again. Such an animal should be suspected of having Johne's disease, especially if the symptoms respond only temporarily or not at all to medicinal treatment.

Since an infected animal will usually die, a post-mortem examination should be made to confirm the diagnosis. A chronic enteritis, characterized by a thickening of the intestinal wall, with the mucosa thrown up in irregular folds is usually present in the lower part of the small intestine and in the large intestine, especially in the region of the ileocecal valve. Microscopic examination of smears made from this region or adjacent lymph glands and stained with an acid-fast stain may show numerous clumps of small, rod-shaped organisms.

No satisfactory method of treating animals affected with Johne's disease has been found. Various antibiotic agents and other new drugs are being investigated, but no conclusions have been reached as to their effectiveness. The control and eradication of the disease will depend

*From the Regional Animal Disease Research Laboratory, Bureau of Animal Industry, Agricultural Research Administration, United States Department of Agriculture, Auburn, Alabama.

largely on the amount of effort the owner is willing to expend and on the extent of infection in the herd. All animals showing clinical symptoms should be removed from the herd immediately and slaughtered. Since young calves are easily infected they should be removed from their dams during the first 24 hours of life. All young stock should be reared separately in quarters that have not been used by mature infected animals. Mangers and feed racks should be protected against fecal contamination. Stagnant water holes should be fenced off or drained. All lots used by infected animals should have all manure and four inches of top soil removed. At the present time a diagnostic agent[4], johnin, used to detect infected animals, is being produced experimentally. It is prepared and used in a manner similar to intradermic tuberculin. Field trials with johnin have given encouraging results in detecting infected cattle.

Livestock breeders should take every precaution to keep their herds free of Johne's disease, because once established, it is difficult and costly to eliminate. When new animals are purchased, the purchaser should realize that any animal from a diseased herd is a potential source of infection, since Johne's disease has such a long incubation period.

Testing and the slaughtering of johnin reactors, improved sanitation, and raising young animals separately has proved successful in eradicating Johne's disease from a number of heavily infected herds. In several states indemnities for cattle slaughtered on account of Johne's disease are paid on the same basis as indemnities for slaughtered tuberculous cattle. The state livestock sanitary official of the state involved should be consulted about it.

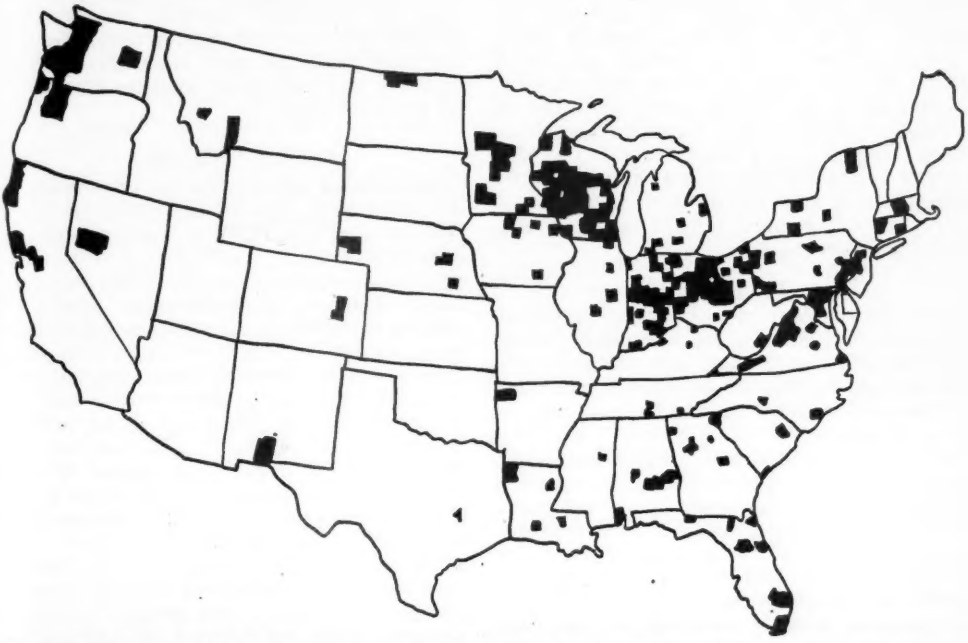

Fig. 1.—Outline map of U. S. showing the wide distribution of Johne's disease. The shaded areas represent counties in which the disease has been diagnosed in one or more herds.

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The Production of an Antigen for Anaplasmosis Complement-Fixation Tests

By L. O. MOTT*, D.V.M. and D. W. GATES*, V.M.D., M.S.
Washington, D. C.

THE Bureau of Animal Industry has realized the need for a good anaplasmosis diagnostic test ever since the disease was first recognized in this country. The nature of the disease is such that the acute stage of infection is followed either by anemia and death or by recovery with an active immunity accompanied by the persistence of the infective agent in the recovered cases, making most cases carriers of the disease for life. These carrier animals appear normal and cannot be differentiated from non-infected animals in a herd where they may remain as a constant unknown source of infection.

Diagnosis

The development of a practical means of diagnosis to pick out these animals would offer a means of control and eradication of the disease and has been a constant challenge to research workers in the Bureau and to other investigators.

The disease may be accurately diagnosed in acute cases by examining stained blood smears which show marginal bodies in the red blood cells when the percentage of these cells affected is 0.5% or more. If what appear to be marginal bodies are found in less than 0.5% of the red cells, a positive diagnosis is usually questionable because on numerous occasions investigators have found a few similar bodies in susceptible, normal animals.

In anaplasmosis carriers, the disease may be diagnosed accurately by removing the spleen, which induces an acute flare-up of the disease accompanied by the appearance of marginal bodies in the red blood cells, or blood may be collected from the suspected carriers and injected into susceptible mature cows or calves that have had their spleens removed to make them more susceptible, following which injection these animals will develop an acute form of the disease within 60 days if the donor is infected with anaplasmosis. These diagnostic methods because of their accuracy are of inestimable value to the research worker; however, they are economically impractical for field diagnostic work. A number of other diagnostic tests have been applied to anaplasmosis with very little success. The complement-fixation test when applied to anaplasmosis on two earlier occasions by Bureau workers gave evidence that this test may have practical value for diagnosis.[1,2] In both instances the antigens were reported to have shown definite antigenic value, but could not be produced in sufficient quantities for extensive studies or for practical use.

Antigen Production

The authors, recognizing the importance of this early work, started searching for practical methods of antigen production, whereby larger quantities of a satisfactory antigen for complement-fixation testing could be produced. A number of bovine crude blood antigens in considerable volume were made from lysed, washed, citrated, red blood cells from acute anaplasmosis cases. These antigens were prepared according to the technique used by the Army for the production of an antigen used with the complement-fixation test for the diagnosis of malaria.[3] A number of difficulties were encountered and overcome in the production of this antigen. The most arduous task was that of raising the parasite count of the red cells, the successful results of which have been of considerable value in the production of later antigens. The average number of marginal bodies per infected cell and the approximate pattern of parasite invasion accompanying an increase in the parasitized red cells is shown in table 3. These bovine crude blood antigens appeared to be specific for anaplasmosis and gave some good positive and negative reactions with samples of known positive and negative sera. However, the tests were somewhat difficult to read because of the high hemoglobin color content and studies were continued to eliminate this objectionable feature.

Another anaplasmosis antigen, carbon dioxide blood precipitate antigen, was then prepared according to the method described by Heidelberger and Mayer.[4] Antigens prepared by this method from normal and anaplasmosis-infected cows and normal horses were found to be unsatisfactory for anaplasmosis complement-fixation work. The investigators observed that a considerable amount of the antigen material was being lost during the processing with this technic and also noted

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a marked difference in the results from processing of bovine and equine red cells. Various changes in the technic were made and tested to correct the faults of the production method; afterward most of the antigens prepared from acute anaplasmosis cases with high parasitized red cell counts produced a better antigen than the bovine crude blood antigen prepared from the same animal, and were also free from the objectionable high hemoglobin color content.

Source of Material

The source of anaplasmosis infective material may be blood from an acute case or from a known carrier animal. The approximate time required for producing an acute case when starting with a carrier as a source animal is shown in table II and may be compared with the use of blood from acute cases shown in table I. It has been demonstrated that frozen citrated blood from an acute case stored for 13 months at —50° C. to —70° C. when injected into a normal cow resulted in an acute case with a 24-day incubation period. A similar amount of infective material from the same acute case, drawn at the same time but injected immediately into a susceptible animal, resulted in an acute case with immediate parasite multiplication without an incubation period. This difference in the incubation period demonstrates the great loss of the anaplasmosis infective agent by freezing and thawing. The inactivation of the anaplasmosis infective agent by freezing and thawing has been further demonstrated in over 90 bovine animals that were injected with processed, washed infected cells from 26 acute cases, the cells having been rapidly frozen and thawed six times before being injected. None of the 90 injected animals became infected with anaplasmosis. The use of dry-ice-stored blood from acute cases appears to have no advantage over the use of carrier blood in reducing the beginning of production time because the incubation periods obtained with both methods are practically the same.

TABLE I.—EFFECT OF SIZE OF DOSE ON LENGTH OF INCUBATION PERIOD; SOURCE ANIMALS ACUTE CASES

Source animal number	Subinoculated animal number	Acute anaplasmosis blood Dose cc	Incubation period (days)
	Unsplenectomized Cow		
3017	2418	0.0002	32
3017	2928	0.0002	34
3055	2831	0.0003	21
3055	2738	0.0003	31
3055	2777	0.0003	31
1868	1848	15.0	22
	Splenectomized Calves		
2528	2563	150.0	17
193J	2879	200.0	10
2259	2680	200.0	6
2596	2375	400.0	3
2942	2941	500.0	* 1
2941	2926	500.0	* 1
2826	2818	1000.0	* 1
2818	2853	1000.0	* 1
2868	2856	2000.0	* 1
	Splenectomized Cows		
2936, 2937, 2938, 2946	2705	**4300.0	* 1
2936, 2937, 2938, 2946	2126	**4300.0	* 1
2936, 2937, 2938, 2946	2766	**4300.0	* 1

*Indicates an incubation period of one day or less.
**The dosage of infective blood tabulated represents the volume of acute anaplamosis blood. However, only the red blood cells from this blood, resuspended in saline, were injected into the subinoculated animals.

Antigen Passage Animals

The best animals for antigen production apparently are normal thrifty calves, 12 to 18 months of age, weighing from 400 to 600 pounds, either male or female, from which the spleens have been removed 30 to 60 days before the inoculation date. Younger calves are suitable but do not yield enough blood. Older animals with and without spleens have been used with some success, but they have been found to be much less uniform in susceptibility than the younger animals. It is also advisable to use animals that have never been inoculated with any biologic product, including normal blood or serum from other normal animals, as such inoculation appears to influence the susceptibility of the calves and probably causes some of the variation in susceptibility of older animals, which usually have had some injections such as vaccinations or inoculations during their lifetime. This cause of suscepti-

TABLE II.—THE EFFECT OF SIZE OF DOSE ON LENGTH OF INCUBATION PERIOD; SOURCE ANIMALS CARRIER CASES

Source Animal number	Subinoculated animal number (1)		Dose (cc)	Incubation period (days)
2026	Calf	2940	10	33
2026	Calf	2956	10	39
2026	Calf	2943	10	33
2026	Calf	2793	50	39
1368	Calf	2976	280	24
2580	Calf	3055	500	14
2580	Calf	3017	1000	11
2580	Calf	3027	1000	9
2026	Steer	3023	1800	12
3055	Steer	3022	2800	6

bility variation is mentioned as an important addition to the five generally attributed causes of variation reported by Lotze;[6] namely (1) age and condition, (2) individual resistance, (3) amount and character of inoculation, (4) ability of individual to regenerate red blood cells, and (5) virulence of specific agent.

Inoculation Methods

The inoculation of the anaplasmosis infective agent is one of the most important steps in the production of a good antigen. The use of carrier blood at a dose rate of 10cc to 50cc for each successive passage, harvested from each acute case at the peak of an acute infection, usually requires four or more passages over a period of three or four months to produce a satisfactory antigen. Infectivity studies covering a 2-year period, in which 60 animals were used in making rapid serial passages in from three to 15 animals for one series, showed that one or two passages from an acute case may result in a high percentage of infected red cells and produce a satisfactory antigen when massive infective doses are given intravenously. The acute donor's blood is harvested in an equal volume of Alsever's solution at or soon after the time of maximum red cell infectivity. At this time the red cell volume will usually average about 10% of the total blood volume. The Alsever's solution is used in place of sodium citrate anticoagulant because it appears to lower the amount of hemolysis in the heavily parasitized red cells, which are much more fragile than red cells from a normal animal. The suspension of red cells in Alsever's solution is then centrifuged in 250cc pyrex centrifuge bottles at 1,900 r.p.m. for 20 minutes, after which the supernatant fluid is siphoned off and the red cells given one washing by resuspending in physiological saline and centrifuging again for 30 minutes at 1900 r.p.m. The saline serum supernatant is then drawn off, the packed red cell volume is measured and the cells resuspended in an equal volume of physiological saline, and this parasitized red cell saline suspension is injected intravenously into the next passage animal. The size of the infecting dose should vary according to the size of the passage animal to be exposed. A dose of 500cc of packed red cells suspended in 500cc of physiological saline was the usual dosage selected for the average passage animal. This represents the cells from about five liters of blood from the acute donor case.

Considerable caution should be used whenever large infective doses from acute cases are inoculated intravenously into animals being exposed, as symptoms of severe shock may begin within a few minutes to a few hours following exposure and result in death of the exposed animals with the loss of the passage material. The toxic or shock-producing agent was found to be present in both the infected animal's serum and its washed red cells, consequently the margin of safety of large doses was increased by removing the serum and resuspending the infected red cells in physiological saline before inoculating, and frequently was increased further by giving the infective material in several doses at one or two-hour intervals. Most cases showing these symptoms of shock will respond temporarily to treatment with one intramuscular injection of epinephrine (epinephrine hydrochloride) but may die later (overnight) unless the exposed animals are kept under constant observation for a 24-hour, post-exposure period during which time epinephrine should be administered whenever symptoms of shock reappear. It is usually not necessary to administer epinephrine more frequently than once every hour in severe cases. The single dosages of 1:1,000 epinephrine used ranged from 1cc to 5cc depending on the animal's reaction.

Satisfactory antigens have been prepared from splenectomized calves and cows and from cows with spleens. It is necessary to observe the course of the disease very closely following inoculation by daily checking the thermal reaction, red cell volume, red cell parasite count, and clinical reactions, since the animal may pass the peak of the red cell parasite invasion and die before the parasitized red cells can be harvested. The observed rate of increase of the parasitized red cells in these artificially infected acute cases is approximately doubled every 24 hours and usually reaches the maximum in seven to nine days. The blood is usually harvested from the infected animals soon after the maximum degree of red cell parasite invasion is reached by fixing the animal in a standing position in stocks with a stanchion front. The operative area is clipped, shaved, disinfected, and locally anesthetized. The blood is collected from the carotid artery into closed flasks containing Alsever's solution if for reinoculation, and into flasks containing sodium citrate when used for antigen production. The processing of the citrated blood is started immediately after the blood is harvested by centrifuging and removing the serum, then washing the cells six times in physiological saline. One volume of the washed red cells is then added to approximately 30 volumes of carbon dioxide saturated, ice-cold, distilled water, which is then agitated, and placed in a refrigerator over night. A pink-white precipitate forms and settles to

TABLE III.—EFFECT OF INCREASE IN PERCENTAGE OF PARASITIZED CELLS ON APPROXIMATE PATTERN OF PARASITE INCREASE IN THE RED BLOOD CELLS

Percentage of parasitized cells	Average number of bodies per infected cell	Percentage of infected cells* showing approximately 1 body per cell	2 bodies per cell	3 bodies per cell	4 bodies per cell	5 bodies per cell	6 bodies per cell	7 bodies per cell
5	1	100						
10	1.12	88	12					
20	1.26	77	20	3				
30	1.34	70	24	4	1			
40	1.43	66	26	6.4	1	0.5		
50	1.60	54	28	10	3.5	1.1	0.1	
60	1.83	40	30	18	4	2	0.5	
70	2.06	38	38	16	7	2	1	
80	2.56	24	25	30	13	6	1	0.6

*Cells counted: 7,120 normal and 2,827 infected.

the bottom of the container. The following day the supernatant fluid is drawn off. The precipitate is centrifuged and washed in ice-cold, distilled water until the supernatant fluid contains no color. This usually takes three or more washings. The carbon dioxide precitate is soluble in salt water and usually shows an acid reaction of about pH4. The amount of washed, packed precipitate is measured, the acidity neutralized with 1.2% sodium bicarbonate, and physiological saline added in sufficient quantity to make a standard concentration of antigen equal to three times the packed precipitate volume. This finished product is then pipetted into ampules, lyophilized, vacuum sealed, and stored at —50° C. to —70° C. until used. The antigen to be used is restored to its original volume with distilled water, thoroughly agitated, then centrifuged slowly to settle any undissolved particles, and the supernatant material is drawn off for complement-fixation work.

Satisfactory antigens have been prepared according to the above-described methods and stored for 2 years at —50° C. to —70° C. without any appreciable loss of antigenicity. However, duplicate samples stored at refrigerator temperatures appeared to show a marked loss of antigenicity after a few months in storage.

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Twenty-six lots of goats (280 animals) were tuberculin-tested and found to be negative.[1]

Four of the commercial goat dairies in Los Angeles County contain more than 600 milking goats.[1]

The parade of horses through local abattoirs includes many fine specimens of draft animals, some of them purebred, for which the demand (other than for fur-animal feed) is extremely limited.[1]

Diarrhea and mild incoördination were observed in a pen of 26 dairy cows[1]. Four hundred cows in other corrals on the premises were not affected. Only the affected cows were receiving dry fodder in the ration. The diarrhea and incoördination ceased, when the fodder was eliminated from the ration.

Examination of the carcass of a cow revealed a well marked inflammation of the abomasum and small intestine[1]. The owner had given her 17 tablets, containing barium chloride and tartar emetic; six tablets being a maximum dose.

In Los Angeles County more good cows are lost from ingestion of foreign bodies than from any single disease[1]. Of the cows autopsied by the county veterinary service last year, 44% had died of "hardware disease." Their value was estimated at $20,000. There is no reason to think that all, or even a majority, of such cases that occurred were brought to the attention of the veterinary service. This large loss is blamed chiefly upon carelessness and negligence.

[1]Report of Los Angeles Livestock Department,—1947-1948.

Serum Levels of Penicillin in Cattle*†

By E. R. DOLL**, B.S., M.A., D.V.M.; M. ELIZABETH WALLACE**, B.S., and ANNA C. NEWTON**, B.S., M.S.
Lexington, Kentucky

THE variable serum level responses occurring in horses and sheep with penicillin in several vehicles using various routes of administration indicated that species and individual variation could be important factors in therapeutic use of penicillin in cattle. Consequently an investigation was made to determine the serum level response of cows to different penicillin preparations.

Methods

The cattle were apparently normal, nonlactating, barren, grade dairy and cross-bred stock. They had free access to hay and water throughout the test periods. Weights of the cows varied from 660 to 1000 pounds. The penicillin doses were measured in units per pound of body weight and were injected intramuscularly in the triceps or musculature of the neck. Blood samples were obtained from the jugular vein at hourly, two-hour or three-hour intervals and were assayed by a serial dilution method using *Streptococcus equi* as the test organism.[1]

Aqueous Penicillin

The potassium salt of crystalline penicillin G was used. Solutions for injection contained 10,000 units per ml and the dosage was 500 and 1000 units per pound of body weight. Samples of blood were obtained at hourly intervals following single intramuscular injections. For doses of 500 units/lb the duration of the serum level response was three hours in four trials and five hours in one trial. With doses of 1000 units/lb the duration was 4, 5, 6 and 7 hours in one trial each. Variation of individual responses at corresponding test periods was twofold to sixfold for 500 units/lb and twofold to eightfold for 1000 units/lb. The averages for the serum level responses is shown in figure 2.

Penicillin in Oil and Wax

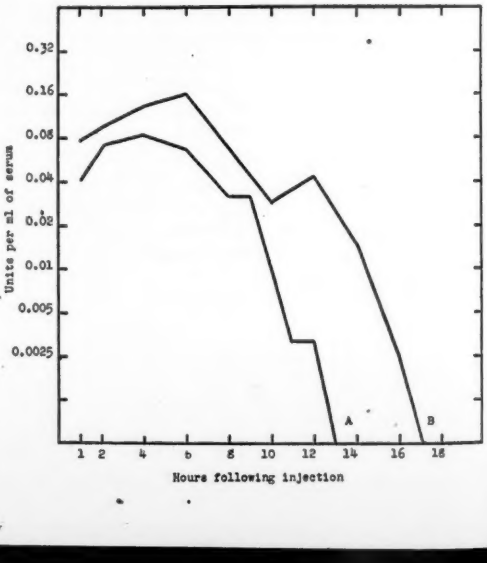
For this series of trials, a preparation containing 300,000 units of calcium penicillin per ml in peanut oil with 4.8% white wax was used. For doses of 500 units per pound of body weight, the serum concentrations showed twofold to 12-fold variation between individual cows at corresponding assay periods. The duration of the detectable serum level period was nine hours in three trials, 10 hours in three trials and 12 hours in one trial, the average duration being approximately 10 hours.

With doses of 1000 units/lb the serum level response of different cows at corresponding assay periods showed fourfold to 16-fold variation. The duration of the measurable serum level period was 6, 8, 10, 12, 14 and 16 hours respectively for six trials with an average duration of approximately 11 hours. The average of the individual serum level responses is given in figure 1.

Procaine Penicillin in Oil

The preparation used contained 300,000 units of crystalline procaine penicillin G in sesame oil. All injections were made into the muscles of the neck. With doses of 1000 units per pound of body weight, the level of penicillin in the serum at corresponding assay periods varied from twofold to fourfold except at the ninth hour, when a 16-fold variation occurred. Duration of the measurable serum level period varied from nine to 18 hours, being nine hours in three trials, 12 hours in one trial, 15 hours in one trial and 18 hours in one trial. The average duration was approximately 12 hours.

FIG. 1.—AVERAGE SERUM LEVELS FOR PENICILLIN IN OIL AND WAX.



*The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.

†The penicillin used in this study was supplied for investigational use by Schenley Laboratories, Inc., New York City, New York.

**Department of Animal Pathology, Kentucky Agricultural Experiment Station.

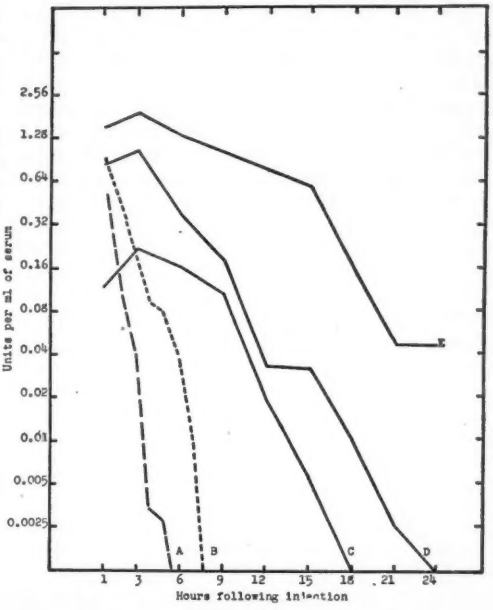
For doses of 2000 units/lb, variation in the individual responses at corresponding assay periods ranged from two-fold to 32-fold. The duration of the serum level response was 12 hours in three trials, 15 hours in one trial, and 24 hours in one trial, with an average of approximately 16 hours.

With doses of 4000 units/lb, the individual serum levels at corresponding assay periods showed twofold to eightfold differences during the first 12 hours following injection and 16-fold to 28-fold variation during the 15 to 24-hour period. The serum level response persisted for 24 hours in all of six trials. The average of the individual responses is shown in Figure 2.

Discussion

The average serum concentrations obtained for corresponding blood samples with doses of 500 units per pound of body weight of penicillin in oil and wax, were usually more than 50% of those obtained with 1000 units per pound. With this product, the serum level was comparable in both duration and quantity to that obtained previously in horses with doses of 500 and 1000 units/lb.[2] Serum levels for horses in another study with penicillin in oil and wax were shorter in duration and much higher in concentration during the first few hours following injection.[3] In the present study, serum levels obtained with penicillin in oil and wax were not significantly different in either concentration or duration from those obtained with procaine penicillin in oil with doses of 1000 units/lb.

FIG. 2.—AVERAGE SERUM LEVELS FOR AQUEOUS PENICILLIN AND PROCAINE PENICILLIN IN OIL.



A—Aqueous penicillin—500 units/lb—5 trials
B—Aqueous penicillin—1000 units/lb—4 trials
C—Procaine penicillin in oil—1000 units/lb—6 trials
D—Procaine penicillin in oil—2000 units/lb—6 trials
E—Procaine penicillin in oil—4000 units/lb—6 trials

The serum concentrations obtained with procaine penicillin in oil for the 1000 unit/lb dose were in general one-half to two-thirds

TABLE I. RANGE AND AVERAGES OF WEIGHTS, DOSES, AND SERUM LEVEL PERIODS.

Form of penicillin	Range of weights pounds	Average weights pounds	Range of dosage units	Average dose units	Variation of serum level period hours	Average serum level period hours
Penicillin in oil and wax 500 units/lb.	660 to 1000	800	330,000 to 500,000	400,000	9 to 12	10
Penicillin in oil and wax 1000 units/lb.	660 to 900	760	660,000 to 900,000	760,000	6 to 16	11
Procaine penicillin in oil 1000 units/lb.	660 to 785	766	660,000 to 785,000	766,000	9 to 18	12
Procaine penicillin in oil 2000 units/lb.	725 to 820	780	1,450,000 to 1,640,000	1,560,000	12 to 24	16
Procaine penicillin in oil 4000 units/lb.	660 to 875	766	2,640,000 to 3,140,000	3,064,000		24
Aqueous penicillin 500 units/lb.	665 to 875	766	330,000 to 392,000	383,000	3 to 5	3.4
Aqueous penicillin 1000 units/lb.	660 to 820	746	660,000 to 820,000	746,000	4 to 7	5.5

less than obtained with 2000 units/lb. The serum levels for the 4000 units/lb dose were two to five times greater than for 2000 units/lb for corresponding samples. Doses of procaine penicillin in oil of 1000, 2000, and 4000 units/lb gave average durations of 12, 16, and 24 hours respectively, whereas the same doses in horses gave average durations of 14, 20, and 24 hours.[3] For the 4000 units/lb dose absorption of penicillin from the intramuscular depot appeared to be more rapid in cattle than in horses as the serum levels for cows at corresponding test periods were two to three times greater during the first 15 hours and fell more rapidly during the 15 to 24-hour period. With doses of 1000 and 2000 units/lb the serum levels during the first nine hours were slightly, but not significantly, higher for horses. However, with doses of 1000 and 2000 units/lb the serum level fell more rapidly after the ninth hour in the cows. The response of individual animals was also much more erratic in cows. There was no apparent reason for the different response obtained in cows and horses.

Summary

With penicillin in oil and wax, serum level responses varying from nine to 12 hours with an average of 10 hours were obtained with doses of 500 units per pound of body weight. For doses of 1000 units/lb, the measurable serum level varied from six to 16 hours with an average of 11 hours.

Procaine penicillin in oil maintained detectable serum levels for nine to 18 hours, with an average of 12 hours, with doses of 1000 units/lb. Doses of 2000 units/lb maintained serum levels for 12 to 24 hours with an average duration of 16 hours. The measurable serum level period persisted for 24 hours in all of six trials with doses of 4000 units/lb.

With aqueous penicillin measurable serum levels were maintained for three to five hours with doses of 500 units/lb, and for four to seven hours with doses of 1000 units/lb.

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Veterinary Achievements and Responsibilities*

To reduce this [animal-disease] burden to the vanishing point must be the principal future objective of veterinary medicine. With staunch and intelligent leadership and a continuing acceptance of social responsibility the veterinary profession can meet this challenge with distinction. This would be an achievement exemplifying the highest function of science: to provide and apply significant truths for the service of man.

* * * *

A contribution of veterinary medicine to human welfare was the demonstration for the first time that an infectious agent can be transmitted from animal to animal by an insect serving as an intermediate host. This discovery, by F. L. Kilborne, Theobald Smith and Cooper Curtice, of the federal Bureau of Animal Industry, may properly be considered one of the epochal achievements of medical research. Their solution of the mystery of cattle tick fever ultimately led to the discovery that many other important diseases are also transmitted by intermediate hosts. Other diseases transmitted by insect vectors include malaria, yellow fever, typhus fever, African sleeping sickness, Rocky Mountain spotted fever, nagana, Chagas' disease and bubonic plague.

Without veterinary control of a host of animal diseases, pestilence, insecurity, poverty, economic disaster and insufficient food supplies would be of common occurrence.

* * * *

Recent information indicates that there are approximately 500 rendering plants in the United States and that the sale value of their products is approximately 400 million dollars yearly. This income is derived from the sale of 64 million pounds of hides, 500,000 tons of fat and nearly one million tons of meat scrap. How many animals, that might have contributed to our food supply, are represented by these figures is problematical.

* * * *

Stock owners and poultrymen are becoming better informed with every passing year. They are entitled to, and will demand, the best that modern veterinary medicine can provide. Incompetence and complacency on the part of veterinary medicine will not and should not be tolerated. Unless the profession keeps not only abreast but a little ahead of the times, confidence will be lost and other means will be sought to meet the disease problems of our livestock industry.

* Excerpts from an address by W. H. Feldman at the 90th Anniversary celebration of the Iowa State College; March 22, 1948.

Veterinary Problems in Poultry Production

By W. R. HINSHAW, D.V.M., Ph.D., California

Hydrated lime applied at the rate of two pounds daily to the droppings of each 100 hens will discourage flies from breeding and act also as a deodorant.

* * * *

It is estimated that the chickens of the United States consume in a year more than 20 million tons of feed—one-sixth of all the concentrate feeds supplied to livestock.

* * * *

One of the important causes of abnormal white barring of feathers in Bronze turkeys is a deficiency of the amino acid lysine (Fritz *et al. J. Nut.* 31:387,1946). The turkey poult's requirement for this amino acid is 1.3 times that of the chick. Good sources of lysine include fish meal, meat scrap, dried skim milk, soybean oilmeal, and dried brewers' yeast.

* * * *

New Treatment for Hexamitiasis of Poults

Preliminary results in research work by McNeil (*California Agriculture* 2:15, Nov. 1948) have shown that marked reduction in mortality from hexamitiasis of turkey poults may be obtained by the use of a mixture of 3% dried whey in a 1 to 2000 copper sulphate solution as a substitute for all drinking water for a period of five to seven days. The treatment must be started in the early stages of the disease, and several precautions are given, concerning its use. These are:

1. Only a good quality dried whey should be used—no other milk products have been of value.

2. The whey settles out of the mixture readily and should be stirred often. Fresh mixtures should be made frequently.

3. Neither copper sulphate nor dried whey alone has proved effective. Likewise the use of the mixture in feed has not been successful.

4. Five to seven days is the optimum time for a single treatment. After from three to five days on plain water it may be desirable to repeat the treatment.

As stated above, this is a preliminary report and much research work is needed to answer the many questions on why such a mixture will reduce mortality when either substance given alone fails. Field and laboratory studies over a three year period were completed before the release of the results, and the author states that researches are under way that may explain the mystery. The cure effected by the whey-copper sulphate treatment is in part due to fact that, whatever the reason, there results a restoration of the normal blood sugar level with an accompanying improvement in the general condition of the poults.

* * * *

The season for brooding chicks and poults for next year's replacements is here again. Veterinarians will do their poultrymen clients a good turn by reminding them that they can insure against losses from pullorum disease by buying chicks or poults from hatcheries which sell only stock from pullorum-free flocks (U.S. pullorum-passed or U.S. pullorum-clean).

* * * *

Further evidence that the sulfonamides will not eliminate pullorum disease carriers from a flock of chickens is presented by Dickinson and Stoddard (*Poultry Science*, 28:153, 1949). They fed 0.5% sulfamerazine in an all mash ration continuously for one to two weeks to pullorum reactor hens, and found that the drug did not influence the agglutination reactions or reduce the number of positive *Salmonella pullorum* carriers as compared to the untreated controls.

* * * *

Copper sulfate is reported by Jaquette (*Am. J. Vet. Res.* 9, p. 206. 1948) to be effective in the treatment for trichomoniasis in pigeons. This is a disease of the upper digestive tract and is caused by *Trichomonas gallinae*. The turkey also is susceptible to this disease as are many wild birds. The chicken is susceptible but does not seem to suffer to the same extent as the turkey. Jaquette's treatment consists of adding 1.4 gram of copper sulfate to each gallon of drinking water for nonbreeding pigeons and 4.0 grams to a gallon for breeding pigeons. Concentrations of the drug greater than these amounts were toxic for the respective types of pigeons. The reason that less of the drug is toxic for breeding pigeons is thought to be due to the fact that they drink more water than nonbreeders, and they therefore get about the same quantity of the copper sulfate. The writer (see Biester and Schwarte, Diseases of Poultry, page 1098) found in studies on this disease in turkeys that a 1-2000 dilution of copper sulfate as a substitute for drinking water was effective, if strict sanitary measures were also employed. Jaquette, too, emphasizes that treatment of pigeons is of little value unless sanitation is also practiced, because pigeons which are freed of the infection remain susceptible.

Sulfaquinoxaline in Field Cases of Pasteurellosis of Swine*

By D. F. EVELETH†, Ph.D., D.V.M.; ALICE L GOLDSBY†, A.B.; F. M. BOLIN†, D.V.M.
Fargo, North Dakota

Pneumonia of swine is frequently encountered in routine diagnostic examinations, but because of multiple factors which may produce pneumonias the actual causal agent is rarely determined. Probably the most frequent cause of primary pneumonia in young pigs is the migration of immature ascarids through the lung tissue. This pathologic condition is frequently followed by the formation of abscesses due to numerous types of pyogenic organisms.

The following cases illustrate the economic importance of pneumonia in swine and at the same time show the value of chemical therapy.

Case I.—June 21, 1948, Dr. E. C. Walker, Fargo, N. D., presented a small pig and a piece of liver from another pig, that he had examined on the farm. The farmer gave the following history: Of 150 pigs farrowed, the older 97 had no trouble but the last 53 had not done well. These pigs were slightly anemic and many showed dyspnea. When the live pig was killed and examined, the outstanding lesions revealed consisted of gray hepatization of the lobar portions of the lungs. The liver specimen contained a small abscess. No specific diagnosis was made at that time.

September 14, 1948, Dr. Walker presented two more pigs from the same drove and of the same age group as those he brought in previously. At this time 17 of the original 53 pigs were dead and, beside the two brought to the laboratory, there were eight more sick. The temperatures of the sick pigs varied between 101 and 103° F. All showed evidence of pneumonia with more or less stunting. The owner stated that as the pneumonia became worse, the pigs refused to eat.

One of the pigs submitted was killed for post-mortem examination. Approximately one-third of the lung tissue was in a stage of gray hepatization, but with no distinct nodules of pus. The liver was cirrhotic with many ascarid scars.

Some of the lymph nodes were enlarged and contained excess fluid while others, especially the mediastinal glands, were hard and contained small abscesses in the process of calcification. In a smear from the lung, bipolar staining organisms were observed. Cultures of *Pasteurella multocida* and *Corynebacterium pyogenes* were obtained from the lungs, liver and lymph nodes.

The eight sick pigs on the farm were given a 5ml dose of a pasteurella bacterin and dosed twice daily with one-half grain of sulfaquinoxaline per pound of body weight (The sulfaquinoxaline was given as the sodium salt). They started eating within 24 hours and all made uneventful recoveries.

The pig kept at the laboratory was treated in a similar manner, except that no bacterin was given. The case history of this pig is summarized below:

9/14 Weight 47 pounds—Refused food. Severe dyspnea. Given 25 grains sulfaquinoxaline.**

9/15 Appetite improved. Given 50 grains sulfaquinoxaline.

9/16 Appetite improved. Given 50 grains sulfaquinoxaline. Dyspnea less marked.

9/17 Appetite improved. Given 25 grains sulfaquinoxaline.

9/18 Appetite improved. Given 25 grains sulfaquinoxaline.

9/20 Weight 52 pounds—apparently normal.

Case II.—The owner of a drove of purebred Duroc swine purchased a boar from out of the state and put him in his swine barn just before his sows were starting to farrow. The boar had a slight cough on arrival but made an uneventful recovery. Of six sows exposed four became sick. These sows had temperatures of 104 to 105° F, complete anorexia and inability to stand. Two of the litters were very sick refusing to even attempt to nurse.

Sept. 24, 1948, two of the sows were treated with a sulfathiazole-sulfapyridine mixture and on the following day with sulfathiazole. They showed no improvement and all four litters of pigs grew steadily worse.

Sept. 25, the four sows were drenched with a solution of sodium sulfaquinoxaline containing the equivalent of one grain of sulfaquinoxaline per ml; 1 ml per pound.

Sept. 26 there was improvement in all sows and they started to eat.

Sept. 27, the sulfaquinoxaline dose was cut in half and given in a slop feed.

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†Department of Veterinary Science, North Dakota Agricultural Experiment Station, Fargo, North Dakota.

The pigs of one litter, all *in extremis*, were killed and discarded 9/25. Two pigs of another litter of three were submitted for post-mortem examination, while the third pig was treated with sulfaquinoxaline and showed improvement the following day. The two pigs examined post mortem presented lesions of a mild catarrhal pneumonia and catarrhal enteritis and swollen kidneys. *Pasteurella multocida* cultures were isolated from the blood, liver, and lungs of these pigs.

Two other litters of 10 and 11 pigs were treated individually with sulfaquinoxaline at the rate of one grain per pound in divided doses, twice daily. These pigs showed improvement within 24 hours.

The value of sulfaquinoxaline in treating these two cases of pasteurellosis in swine seems definite. There is not much information available concerning the therapeutic value of this drug in large animals but its efficacy against Pasteurella organisms in both experimental and field cases of pasteurellosis in poultry have been reported.[1,2,3,4]

Cameron and McOmie[5] have shown that sulfaquinoxaline is absorbed rather slowly from the gastrointestinal tract of lambs. We have not determined the blood concentration but repeated doses of one-half grain per pound of body weight, given twice daily to chickens, lambs, cattle, and swine have not produced signs of toxicity when given for three and four-day periods.

**The sulfaquinoxaline was given as the sodium salt in the form of a drench.

Larsen[6] has shown that sulfamethazine is useful in treating pneumonia in swine caused by a Hemophilus-like organism. Edmonds[7] demonstrated that sulfathalidine and sulfamerazine were of value in treating the enteritis-pneumonia syndrome of garbage fed swine.

Summary

A limited number of cases of pasteurellosis in swine have been successfully treated with sulfaquinoxaline.

Acknowledgement

The authors wish to express their thanks to Dr. D. F. Green of Merck and Company, Inc., Rahway, New Jersey, for the sulfaquinoxaline used in these studies.

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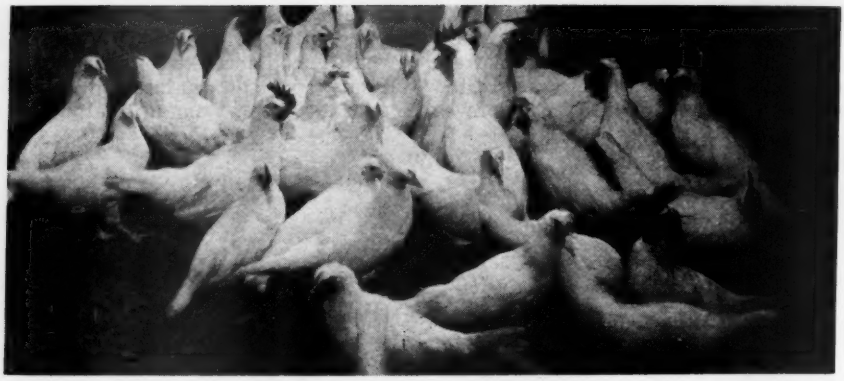

Sulfaquinoxaline Treatment in an Acute Outbreak of Fowl Cholera

By W. H. ARMSTRONG, D.V.M.* and R. A. BANKOWSKI, D.V.M., Ph.D.**
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DELAPLANE and co-workers[1], and Peterson[2], have reported on the successful control of fowl cholera in chickens with sulfaquinoxaline. The purpose of this report is to record an experience in the treatment of a field outbreak of acute fowl cholera with sulfaquinoxaline starting after severe losses had occurred.

The flock in question consisted of approximately 650, 7½-month-old, White Leghorn pullets. The owner reported observing sickness and losses in the flock for about 10 to 14 days with a total loss of about 100 birds. The pullets at this time were also showing some signs of a neck molt. Examination of the dead birds revealed typical lesions of fowl cholera, and *Pasteurella multocida* was isolated from the hearts and livers of several birds. This organism was repeatedly isolated from dead specimens which were brought in to the laboratory during the course of the experiment.

Despite the advanced stage of the outbreak, it was decided to attempt to control further losses with sulfaquinoxaline. The house was divided into two rooms which were separated by a solid board partition. One room contained 161 chickens which were held as controls. The other room contained 283 chickens which were designated for treatment. A special effort was made to divide the obviously ill birds between the two groups. The treated group was fed a mash containing 0.05% sulfaquinoxaline for three days, followed by a period of five days on the regular mash. This schedule of treatment was repeated four times.

The results obtained with the 3-and-5-day schedule, shown in figure 1, indicate that the drug was effective in decreasing the mortality during the first few days but deaths due to the disease recurred when the medicated feed was withdrawn. It was believed, therefore, that a continuous treatment would be more effective and the medication was changed to continuous feeding of a 0.033% sulfaquinoxaline mash. No change in the mortality was noted during the following days (Chart I) and it was observed that the amount of molting in the treated and control flocks was continuing.

On the 7th day of the continuous feeding of the medicated mash it was learned that the blood sulfaquinoxaline levels in molting chickens were considerably less than in the laying birds. (table I). Losses from fowl cholera be-

TABLE I.—SULFAQUINOXALINE BLOOD LEVELS IN MILLIGRAMS PER 100 ML OF BLOOD, IN MOLTING AND NON MOLTING CHICKENS ON THE 7TH AND 27TH DAYS ON A 0.033% MEDICATED MASH.

	1st Test[1]			2nd Test[2]		
		Mg. % SQX[3]			Mg. % SQX	
	No. birds	Av.	Range	No. birds	Av.	Range
Molting	6	0.26	0 – .56	9	0.02	0 – 0.20
Non-molting	11	0.88	0.2–2.50	9	0.42	0.20–0.75

1. Birds bled on 7th day of continuous feeding of 0.033% sulfaquinoxaline mash.
2. Birds bled on 27th day of continuous feeding of 0.033% sulfaquinoxaline mash.
3. Milligrams sulfaquinoxaline per 100ml. of blood.

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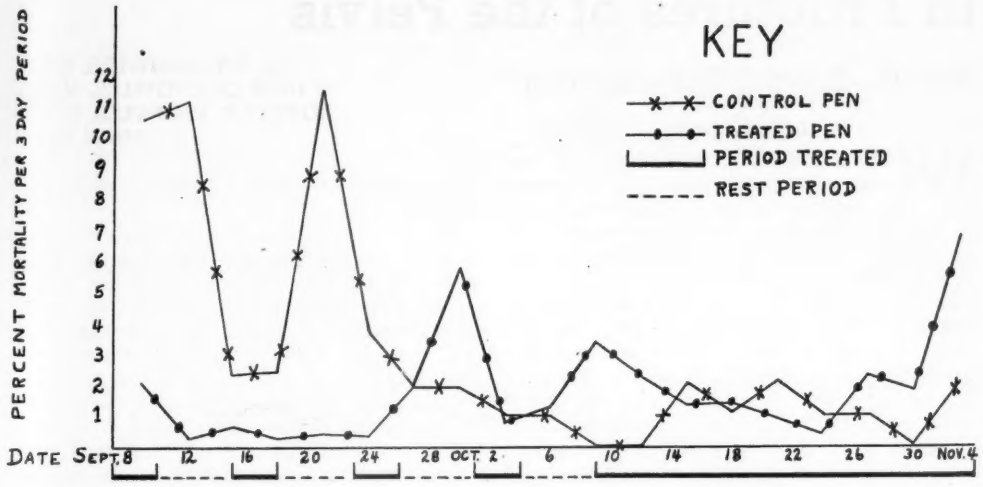
CHART I.—PERCENT MORTALITY PER THREE DAY PERIODS IN CONTROL AND TREATED GROUPS—THE LATTER WERE GIVEN A 0.05% SULFAQUINOXALINE MASH ON A 3 TO 5-DAY SCHEDULE AND LATER A 0.033% MEDICATED MASH CONTINUOUSLY.



came so severe by the 27th day of continuous feeding of the drug, or 59 days after sulfaquinoxaline treatment was started, it became necessary to terminate the experiment. Sulfaquinoxaline blood levels were determined in nine molting and nine non-molting birds on the final day of the experiment. Only one of the nine molting chickens showed a significant amount of the drug in the blood (0.2mg) while the nine non-molters showed an average of 0.42mg of sulfaquinoxaline per 100ml of blood.

Discussion and Summary

Throughout these trials the drug was carefully and uniformly mixed into the mash. The use of sulfaquinoxaline in the feed as a treatment in a field outbreak of fowl cholera in laying pullets was effective in reducing losses. The mortality during a 58-day period of treatment was 28.2% in the treated birds compared to 44.1% in the controls. Blood sulfaquinoxaline determinations made on birds in the treated flock showed that molting chickens did not have a sufficient amount of the drug in the blood to be of therapeutic value. Molting, therefore, appears to have served as an index of lowered feed (and drug) intake, and had this been recognized earlier, a compensating adjustment of the level of the drug might have been made. Furthermore, had the diagnosis been made and treatment started earlier in the outbreak before molting became widespread, the treatment should have been much more effective.

This experience shows the value of using blood level drug determinations as an index of effectiveness of flock medication. Also, variations in feed and water consumption and consequent drug intake as influenced by factors such as molting and state of health must be considered in using sulfonamides in feed or water as a flock treatment.

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* * * *

In several tests sulfamethazine therapy was determined to be of value in coccidiosis (*Eimeria zurnii*).

* * * *

Dr. J. E. Wilson, of the veterinary laboratory, [British] Ministry of Agriculture and Fisheries, reports success in the treatment of coccidiosis in chickens with mepacrine hydrochloride, a drug much used during the war for the treatment of malaria in soldiers.

* * * *

Dr. H. C. Hou, a Chinese scientist, has demonstrated by feeding experiments what has been assumed for some time; i.e. that birds obtain vitamin D from "preening" and small mammals from licking irradiated oil from their fur.

Clinical Application of Splints in Fractures of the Pelvis

Part II—Special Consideration

By A T. KNOWLES, D.V.S.
JACK O. KNOWLES, V.M.D.
ROBERT P. KNOWLES, D.V.M.
Miami, Florida

Introduction

WE FEEL that the general use of the Kirschner-Ehmer splint will compare favorably with that of any other instrument or technic. However, its widest margin of superiority occurs in the field of special application which is discussed in this paper. The reader is referred to a paper by Dr. Wade O. Brinker, (VETERINARY MEDICINE, Feb. '49), in which the use of this splint in fractures involving bones of the skull is described. Part I of this series dealt with the use of this splint on long bones. This paper will be confined to a discussion of its application to the pelvis.

Our records indicate that nearly one-half of the fracture cases, which we are called upon to examine, involve the pelvis in one way or another. For many years, we arbitrarily divided pelvic fractures into two groups; those which would heal satisfactorily without specific treatment and those which were severe enough to require euthanasia. We did nothing to help them, aside from confining the patient in order to discourage walking, supplying a nutritious diet and giving general care. Admittedly, many of those cases which were confined, finally healed sufficiently to become ambulatory, but 80% of them were obviously permanently lame or disfigured. As our success in handling fractures of long bones improved, with the use of this splint, we became more and more dissatisfied with our method of handling pelvic fractures, and soon began to apply the splint to fractures of the pelvis with extremely gratifying results. We still recommend rest and confinement in those cases which will heal without splintage with practical results, but in cases in which there is involvement of the acetabula or in which displacement of the parts is such as to result in unsightly lameness, the Kirschner splint is our answer.

It should be remembered that the pelvis is essentially a semicircle of bone suspended from the vertebral column by ligamentous attachments. It is encircled by muscular layers which tend to protect its shape and position. Malposition resulting from traumatic injuries is usually medial. The availability of digital examination per rectum affords an excellent opportunity to compare the injured with the non-injured side and to correct such malposition.

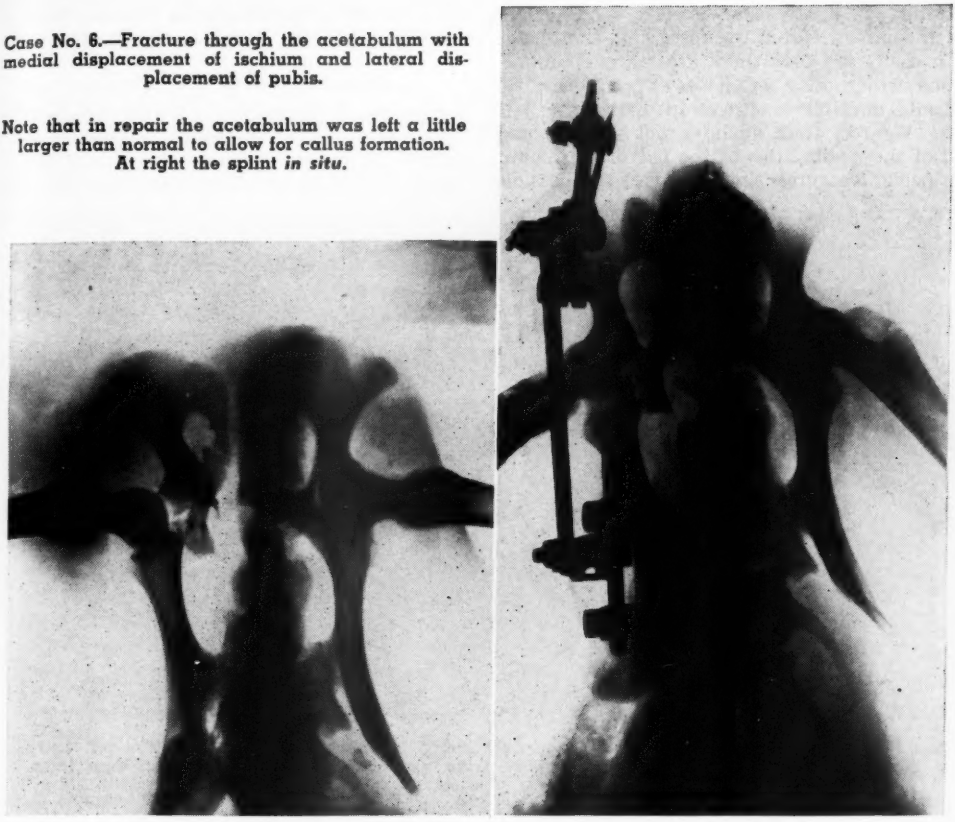
In no other phase of veterinary medicine is good radiography and radiographic interpretation so important as in pelvic orthopedics. The coördination of visual and manual investigation places the operator in an advantageous position, but uncertainty as to the visual picture leads only to confusion and consequently to failure. Most practitioners can palpate a femur and with reasonable accuracy determine whether or not it is fractured and obtain some idea as to the location, type and severity of the fracture. However, the same practitioner is at a loss to determine identical data regarding a pelvic fracture, with any degree of accuracy, unless he has available clear, dorso-ventral radiographs. All radiographs of the pelvis should be taken with the animal on its back. It is well to determine beforehand if fecal material is present in the rectum and, if so, to remove it by enema. The well-washed and dried film should be studied carefully, before surgery is attempted.

Technic

The same basic rules apply to application of the splint to the pelvis as to other bones. The first question to ask oneself is, how many pins will be necessary? The fracture may require from two to four sets of pin assemblies for proper reduction and fixation. A simple fracture of the wing of the ilium will require but two, whereas injuries involving the ilium, ischium and pubis on one or both sides may require several. A very important part of the preparation for surgery of this kind is to determine what bone or fragment of bone is in normal position and fixed. That portion will form the "anchor" for the splint. It is of paramount importance that this anchor be selected carefully, and that the pins be inserted correctly, for it is the keystone of the splint, and success in pelvic orthopedics depends largely upon the skill with which it is selected and pinned. We like to "tie" to the wing of the ilium if possible. In simple fractures of the ilium (Case No. 6) a pin assembly is inserted meso-ventrally through the wing of

Case No. 6.—Fracture through the acetabulum with medial displacement of ischium and lateral displacement of pubis.

Note that in repair the acetabulum was left a little larger than normal to allow for callus formation. At right the splint *in situ*.



the ilium at the sacroiliac articulation and part way into the sacrum and connected by a pin bar. This gives a solid foundation for the building of the splint. Two more pins are inserted through the ischium, one directed through the tuber ischii and the other through the posterior portion of the ischium and these connected by a pin bar. These two pin assemblies are then connected by means of a rod and double clamps. Digital palpation per rectum determines proper penetration by the pins as well as any adjustment which may be necessary. Lateral pressure with the inserted finger, combined with lateral tension of the femur, will bring about acceptable alignment of the affected parts. The double clamps are tightened onto a connecting bar and the splint is fixed. It is frequently necessary to take a radiograph and then readjust the splint before proper alignment is accomplished, since, as was mentioned, digital examination alone may be misleading. In the final analysis a clear radiograph demonstrating good alignment is the criterion of successful reduction.

In cases in which rupture of the sacroiliac ligament complicates a fracture on the same side, it becomes necessary to bridge across from one side of the pelvis to the other (Case No. 7). In this case only two pins are inserted into the side opposite the fracture. One is inserted through the wing of the ilium and the other through the tuber ischii. They are then connected by a long pin bar. These pins are inserted and fixed first. Posterior pressure is then exerted on the femur of the opposite side. When the tuber sacrale is felt to slip into its normal articulation with the sacrum, a pin assembly with bar is applied to the wing of the ilium as previously described, and another similar assembly is applied to the ischium. The fracture is reduced and fixed to a long connecting bar by double clamps. The sets of pin assemblies are joined by a long connecting bar run through double clamps at right angles to the bar connecting the two groups on one side over the back to the single assembly on the other. This actually involves the use of one and one-half splints and gives good results if care is taken to insert the pins in such manner that they do not

extend sufficiently far laterally to interfere with comfort. From the foregoing, the reader can easily see that there are many combinations which may be necessary in order to handle multiple fractures involving the pelvis. We feel that we have not yet explored all of the possibilities of the use of this splint on pelvic fractures, since many of the possible combinations have not been presented to us. We welcome communication from anyone who may have experience in this field or who may care to try his hand at pelvic orthopedics.

Case No. 7.—Fracture of shaft of right ilium, right pubis, symphysis pubis, and tear of left sacroiliac ligament with anterior displacement of entire pelvis except for anterior segment of right ilium.

Note (at right) the slightly anterior position of left pelvis. It was necessary to fix this segment in this position to preserve continuity as a result of shortening of right segment.

Statistics

At this writing we have completed 72 cases in which this splint has been used. These range from simple to compound and comminuted fractures and from fractures of only one bone to fractures of four bones simultaneously. We have employed the Kirschner splint on long bone fractures as follows: femur 31, tibia five, humerus one, radius three. In two cases it has been used for reduction of scapular fractures. In one case each, to correct soft tissue injury to the scapulohumeral joint, the tibiotarsal joint, and the coxofemoral joint. We have used it in four cases of fracture of the mandible, 13 cases of fracture of the pelvis alone and four cases in which the femur and pelvis were fractured. Of the multiple fractures we have had one case each of both radii; both femora; femur and tibia; tibia, femur and pelvis; and one involving a tibia, both femora and the pelvis. In one case it was applied to the humerus of a cockatoo.

Summary and Conclusions

A series of two articles covering the clinical use of the Kirschner-Ehmer splint is presented. One deals with the use of this splint on long bones. The other describes its use on the pelvis. Seventy-two cases are reviewed with radiographs illustrating various types of fractures.

1. Many fractures of dogs are of such nature that pin fixation is necessary for satisfactory reduction.
2. The Kirschner-Ehmer splint is easily adaptable to most any type of fracture.
3. Its use should be restricted to those fractures which will not respond to other simpler, less expensive methods of repair.
4. With a little thought, patience and practice, the afore-mentioned splint can become one of the most useful orthopedic appliances available to the veterinarian.

* * * *

Thomas Dover (1660-1742), a buccaneer, who by his rescue of Alexander Selkirk, inspired Defoe's ROBINSON CRUSOE, retired from the sea at the age of 40, took up the practice of medicine in England and became the leading quack of his day. His name survives in Dover's Powder (ipecac and opium).

My Future Hospital

Like all veterinarians I hope, some day, to have a new hospital built according to my specifications. Since I have been out of school I have drawn at least 50 different plans trying to lay out one that is economical to build and economical to operate; one that saves steps and in which I will enjoy working and be proud to own.

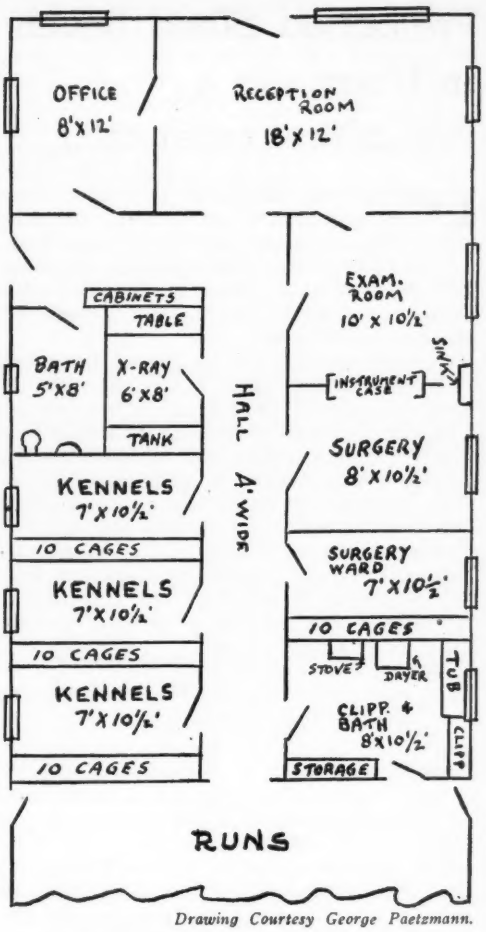
The accompanying diagram is my current ideal. Maybe, before I build, I will do some changing but only if changes will better the situation that obtains at the time of building.

At the first glance one might think that the rooms are too small, but in my philosophy excess space is "dead" space. Every room has been measured numerous times and the way the plan calls for placing the furniture and equipment, there is plenty of room.

Some of the features of this plan that please me and the reasons why I like them are: There is a sink in the wall between the examination room and the surgery and foot pedals in each room to regulate the flow of water. A sink so located will serve both rooms. Also, there is an instrument case in the same wall with glass doors on each side so that any instrument can be reached from either room. I have one in my present hospital and find it a convenience and time saver as it saves many steps a day and, in addition, makes a good impression on clients. There is a hall, notwithstanding many regard it as a waste of space. Having a hallway, one is able to carry a dog to the back of the hospital without going through the examination room, surgery or through any of the kennel rooms and disturbing the other animals. There are several reasons for the side entrance; the most important being, when a client brings in an old dog that has been with the family 10 to 15 years and calls for euthanasia, he appreciates an opportunity to leave by the side entrance, rather than go through the reception room, where there may be other clients. Another reason is when the truck comes for those unfortunate animals that do not go back home, it attracts less attention.

The reason for placing the x-ray room and bathroom side by side is the economy in plumbing that results from putting all the water pipes and drains for the bathroom and the x-ray tank in the same wall.

The size of the kennel rooms will probably be questioned, but I believe that cages should be on one side of the room only, especially if cats and dogs are kenneled in the same room. My cages are 2½ feet deep which leaves 4½ feet between the cages and the opposite wall. In my experience this is plenty of room.



Drawing Courtesy George Paetzmann.

Mechanical ventilation is essential in a hospital anyhow, so volume for the kennel room does not have to be considered.

The hospital in general will be constructed so as to eliminate corners and ledges, to make it easy to clean and keep clean. The doors will all be flush type. The door casings, window casings and the baseboards will all be flush with the walls so that dust will have fewer places to collect.

Many readers will think of several changes that could be made in putting up this building.

I shall be more than happy to hear from any who offers suggestions that they think might improve my projected hospital. I may not adopt them but I shall certainly give them thoughtful consideration. I don't want to make any mistakes, that can be avoided by accepting good advice.

JOE RIDGWAY, D.V.M.
Ventura, Calif.

Prolonged Blood Levels **in Dogs** with a Penicillin Preparation

By J. LA VERE DAVIDSON, D.V.M.
JEAN LYTLE WILEY, B.S., M.A.
MARGARET A. TROOST, B.S.
Kalamazoo, Michigan

DEPO*-PENICILLIN is comprised of crystalline procaine penicillin G specially pulverized so that the particle size is less than five micra and suspended in peanut oil gelled with 2% W/V of the dispersing agent, aluminum monostearate. Each cubic centimeter contains 300,000 units.

Crystalline procaine penicillin G is the water insoluble procaine salt of benzyl penicillin. It contains one molecule of penicillin G combined with one molecule of procaine base and is a highly potent antibacterial agent, effective against a wide variety of pathogenic organisms. The addition of aluminum monostearate acts as a dispersing agent and maintains a property known as "thixotropy" which aids in keeping the small particles of crystalline procaine penicillin G well dispersed, and thus in maintaining the mixture in an easy flowing fluid state. Aluminum monostearate also acts to repel water in the tissues and by virtue of this characteristic delays absorption and prolongs the effect of penicillin.

Prolonging of Effect by Delayed Absorption

Due to the small particle size of the crystalline procaine penicillin G and also because the aluminum monostearate increases water repellency, this preparation provides a slow rate of absorption of penicillin by the tissue fluids. As a result, effective blood levels of penicillin are sustained for prolonged periods.

Report of Blood Levels in Dogs

The penicillin blood levels of seven dogs are reported in this study as an illustration as to the length of time, that effective blood levels were maintained at various dosages after injecting with the penicillin preparation with which the tests were being made. The animals used were healthy, mixed-breed dogs of approximately the same weight. The following chart shows the laboratory findings. The Food and Drug Administration subtilis method of blood assay was used in determining the penicillin blood levels. The injections were made intramuscularly, injecting the dosage deep in the gluteal muscles. No local untoward reaction was noted in any of the animals.

Table I shows the average penicillin blood levels in normal dogs up to 96 hours after injecting with this penicillin. In two animals a therapeutic blood level persisted for 168 hours, or one week. It is generally accepted by the Food and Drug Administration and other authoritative groups, that blood levels in excess of .03 units per milliliter of blood serum are therapeutically effective.

TABLE I.—AVERAGE PENICILLIN BLOOD LEVELS AT VARIOUS INTERVALS UP TO 96 HOURS, FOLLOWING DEPO-PENICILLIN INJECTIONS.

DOSE & WEIGHT	Serum Concentration of Penicillin (units per cc.)					
	1 hr.	8 hr.	24 hr.	48 hr.	72 hr.	96 hr.
100,000 units av. wt. 33 lbs.	2.04	.87	.43	.22	.12	.10
300,000 units av. wt. 38 lbs.	2.50	1.56	.87	.50	.31	.14

Summary

In this initial experiment the indications are that depo-penicillin in doses of 100,000 to 300,000 units will produce therapeutically effective blood levels in dogs for sustained periods. This should be of interest to small animal practitioners, due to the frequency of conditions in which penicillin therapy is indicated.

Naturally, the dosage and time interval between doses in the treatment of clinical cases will vary in each individual. A dosage for dogs of 100,000 to 300,000 units of the penicillin mixture every 48 hours, probably will suffice for the average canine patient. The Food and Drug Administration has recently recommended[1] a minimum of 2,000 units of penicillin per pound of body weight for animals. However, severe infections or infections caused by less sensitive organisms may require up to double the minimum dosage.

*Reg. Trademark of The Upjohn Company.

[1]Federal Register 14:239, January 18, 1949.

Clinical Reports

Serious Eversion of Rectum and Vagina in a Calf

A roan, Shorthorn heifer calf, approximately three months of age, and showing a complete prolapse of the rectum, vagina and cervix was presented March 25, 1949. The rectum had been exposed two weeks and was edematous, severely lacerated, and necrotic. The vagina and cervix were edematous, greatly inflamed and very firm to the touch. The calf had developed a diarrhea and strained constantly.

The exposed tissues, tail and surrounding areas were cleansed thoroughly with soap and warm water. To anesthetize the parts 12cc of a 1% solution of procaine hydrochloride was injected epidurally. The prolapsed vagina and cervix were so edematous that replacement was impossible at first. A three-inch gauze bandage was repeatedly wrapped around these tissues until their size was reduced and replacement was possible. Three interrupted sutures of umbilical tape were placed in the thick skin about two inches from and on either side of the vulva. Strong bandage material was passed through the loops in both a horizontal and diagonal direction.

It was deemed best to amputate the exposed portion of the rectum. It was necessary to incise through the mucous membrane down to the lumen of the bowel in order to insert a finger and guide the placement of the sutures. Using a single strand of umbilical tape and a full curved needle, five interrupted, mattress sutures were placed around the circumference of the bowel just posterior to the anal sphincter. The needle was inserted into the lumen and then directed outward. The rather profuse hemorrhage that occurred was controlled by ligating all large bleeding vessels. The prolapsed portion of the rectum was removed by an incision about an inch posterior to the sutures. Following this, a purse string suture was inserted.

The perineal region remained swollen for about a week following the operation and it was necessary to wash the anus, vulva and surrounding area daily with warm water. The diarrhea, accompanied by straining, continued for about a week. Two days following the operation, the calf's temperature was 104°F. and 104.2°F., on the third day. Penicillin (100,000 units subcutaneously) and 100 grains of sulfaguanidine (orally) were given; followed the next day by another 100 grains of sulfaguanidine. During the day the temperature returned to normal, the appetite was restored and alertness improved noticeably.

The purse string suture and the retention loops and bandage were removed seven days after the operation and the calf was discharged from the hospital April 14, 1949.

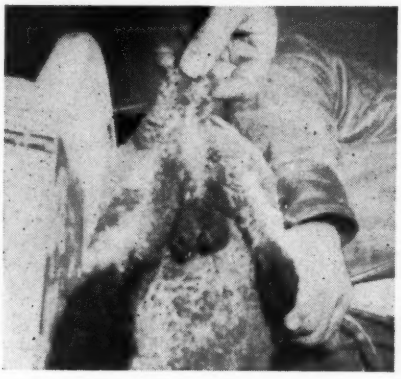
Complete prolapse of the rectum is quite common in cattle, but a prolapse of the vagina and cervix is rare at this early age. Since the simultaneous prolapse of the two, and the necrotic condition of the rectum made the prognosis in this case very unfavorable, the outcome was particularly gratifying.

WM. M. SANTORO, D.V.M.

Brattleboro, Vt.

Hermaphrodism and Atresia Ani in a Young Sheep

Dorland, the lexicographer, defines hermaphrodism as, "of double or doubtful sex". A lamb brought to me for examination April 3, 1949, showed a scrotum in which no testicles were palpable. There was no penis or penile sheath; the urine being voided through a small opening in the scrotum, which may be seen in the illustration. The animal was six to eight weeks of age and was first noticed



This lamb was sans anus till it was six to eight weeks of age.

to be abnormal by the owner when he was preparing to castrate the young rams. In addition to the anomalies mentioned there was no anus and the abdominal cavity was severely distended.

The artesia ani was overcome by incising the tissues over the anal area and after the rush of bowel contents had subsided the rectum was packed with cotton while the rectal walls were sutured to the perianal tissue. Interrupted mattress sutures of chromic catgut were used to unite the mucous membrane to the skin. The photograph was taken prior to the operation. At the present

time, a month later, the animal is in perfect health.

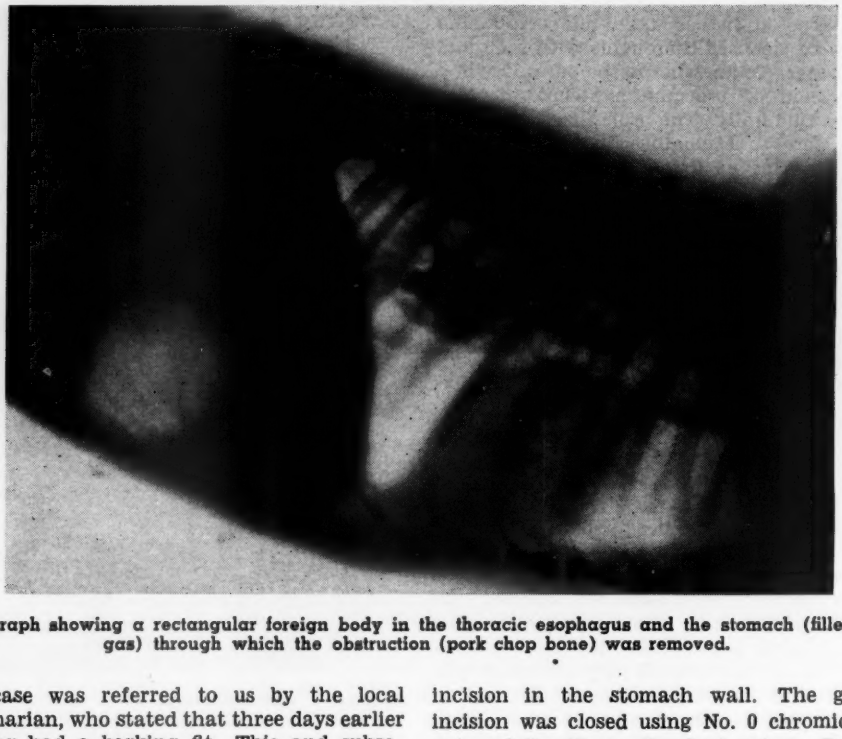
EDWIN E. EPSTEIN, D.V.M.

Sedalia, Mo.

Esophageal Obstruction in a Dog

A champion, four-year-old, fawn, male Pekingese, weighing about 10 pounds, was presented for treatment, at the Kansas State College veterinary clinic.

The history was rather confusing since the owner, a physician, stated that the dog, apparently, had something lodged in one lung.



Radiograph showing a rectangular foreign body in the thoracic esophagus and the stomach (filled with gas) through which the obstruction (pork chop bone) was removed.

The case was referred to us by the local veterinarian, who stated that three days earlier the dog had a barking fit. This and subsequent attacks occurred whenever the animal attempted to swallow solid food. An *x*-ray taken by the owner of the dog showed a large foreign body imbedded in the deep thoracic portion of the esophagus.

The dog was offered soft food and broth, and 100,000 units of penicillin was given. The following day the temperature was noted to be 103.5°F. An infant stomach tube was passed into the stomach without difficulty. Milk and broth was taken by the animal but when solid food was attempted, he went into a barking fit. Immediate surgery was decided upon to remove the foreign body.

After shaving and disinfecting the skin with tincture of iodine, a laparotomy incision was made on the median abdominal line under ether inhalation anesthesia. The stomach was opened on the greater curvature in the cardiac portion. By passing a rat-toothed forcep through the stomach opening, the cardia and up the esophagus the foreign body was grasped but could not be withdrawn because of projections imbedded in the esophageal walls. By digital manipulation the surgeon was able to free the three-pronged pork chop bone, one projection at a time, and bring it through the incision in the stomach wall. The gastric incision was closed using No. 0 chromic catgut and the Czerny-Lembert suture. Braided silk No. 16, was used to close muscle and skin incisions. The animal was discharged, for postoperative care, to the local veterinarian who referred the case.

Three weeks later the owner reported as follows: "I am happy to say that 'King Wen of Sunset' has recovered from the operation you performed for the removal of an impacted bone in the lower esophagus."

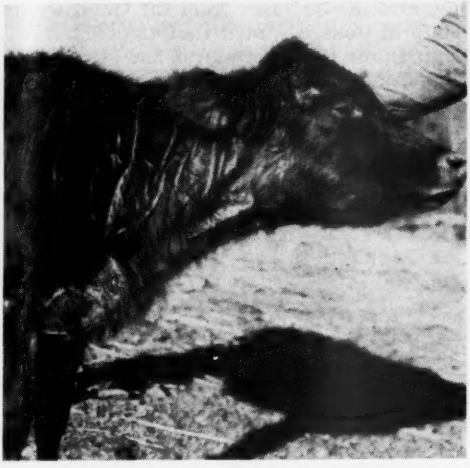
E. J. FRICK, D.V.M.
MARK FIELD, D.V.M.

Kansas State College,
Manhattan, Kans.

Rumors Attributing Harmful Effects to DDT Unfounded

In recent weeks, a thrifty crop of rumors charging DDT with a variety of harmful effects on man, livestock, and forage and other crops, have been given wide currency. That the new disease, hyperkeratosis of cattle, has resulted from spraying these animals with DDT in oil, gained particularly wide acceptance.

To stop the publication of such rumors in newspapers and in the farm press, the Federal Security Agency and the USDA issued the following joint statement, April 5:



Above: Skin lesions of hyperkeratosis on head and neck of a calf eight months of age.

Right—Costal region of the same calf. Photographs by Dr. Frederick R. Stanton.

Many newspaper reports have been published attributing hyperkeratosis to the use of DDT in cattle sprays. Such reports are unfounded.

"A number of statements have been published during the last several days which have misled and alarmed the public concerning the hazards of using DDT as an insecticide.

"DDT is a very valuable insecticide which has contributed materially to the general welfare of the world. It has been used with marked success in both the control and prevention of such insect-borne diseases as malaria and typhus and of insects which are injurious to livestock.

"It is well recognized that DDT, like other insecticides, is a poison. This fact has been given full consideration in making recommendations for its use. There is no evidence that the use of DDT in accordance with the recommendations of the various Federal agencies has ever caused human sickness due to the DDT itself. This is despite the fact that thousands of tons have been used annually for the past four or five years in the home and for crop and animal protection. However, minor toxic symptoms may be produced by kerosene and various solvents used in DDT insecticidal mixtures.

"Statements that DDT is responsible for causing the so-called 'virus X disease' of man and 'X disease' of cattle are totally without foundation. Both of these diseases were recognized before the utilization of DDT as an insecticide.

"The Food and Drug Administration has not prohibited the use of DDT in spraying dairy cattle and barns. The Federal Food, Drug and Cosmetic Act requires the Food and Drug Administration to insure that the food supply of the American people does not contain any poisonous or deleterious substance that is not necessary in the production of the food. Studies by the Bureau of Entomology and Plant Quarantine have shown that DDT when used on dairy cattle or when present on fodder fed to dairy cattle may appear in the milk. They also say that DDT in small quantities can be detected sometimes in milk following ordinary use of the insecticide for fly control in dairy barns. Because of the vital importance of milk in the diet of infants, children and adults of all ages, it is essential proper precautions be taken to protect the supply.

"There is no justification for public alarm as to the safety of the milk supply from the standpoint of DDT contamination."

Cesarean Section on a Hereford

A registered Hereford, 32 months of age, was first observed in labor Monday evening, April 18, 1949. She had not calved by the following day and the owner attempted to give assistance. I was called on Tuesday and that evening made an examination of the cow.

A diagnosis of a pelvic deformity was made. The shafts of the ilii were curved medially narrowing the birth canal to one-half its normal width. To complicate matters further there was a vertical spine approximately 2.5 to three inches in height at the anterior aspect of the symphysis pubis, thus making it impossible for the head of the fetus to pass into the pelvis. A cesarean section was advised.

The ventral operation was performed; the operative area being to the right of the median plain halfway between it and the right subcutaneous abdominal vein. The operative area was infiltrated with a 2% procaine hydrochloride solution. An incision approximately 16 inches in length was made through the skin and the aponeurosis. The pregnant horn was brought into the opening until the latter was completely filled. An incision was then made through the wall of the gravid horn large enough to permit removal of the dead fetus and the placenta. The uterus was well irrigated with normal saline and sutured with a double row of continuous catgut sutures. The aponeurosis and skin incisions were both sutured with umbilical tape using a continuous suture on the aponeurosis and interrupted sutures on the skin. A sulfanilamide pack was then placed over the wound and a canvass support around the abdomen.

Immediately following the operation, 1000cc of whole blood was injected into the jugular vein, and 500cc sulmet solution was given intraperitoneally.

The patient was standing and eating three hours after the operation. An examination one month after the cesarean section revealed complete recovery.

The owner is more interested in obtaining progeny, if possible, from this cow for cross breeding purposes than in salvaging the market price for her, therefore, he was advised to breed her again, after a three months rest period, and at the end of the gestation period to call upon his veterinarian for a second cesarean at the first indication of parturition.

GERALD I. POTTROFF, D.V.M.

Liberal, Kans.

Canada Seeks Area Accreditation and Warble Fly Eradication

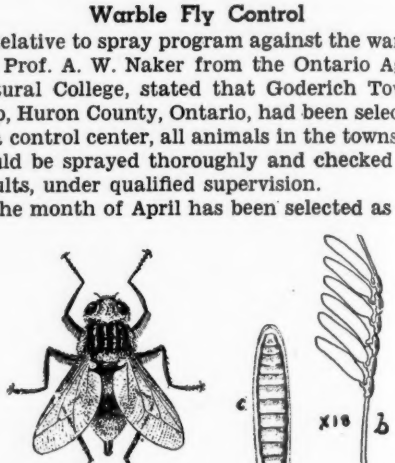
In view of the fact that the United States is likely to demand that all cattle imported from Canada shall come from accreditation areas instead of from herds accredited individually, the Veterinary Director General, Doctor T. Childs, when addressing a recent meeting of cattle breeders, of Ontario, stressed the early adoption of this plan to comply with America's requirements. Furthermore, applicants who desire herd accreditation, and have not as yet been considered, were advised that this procedure should be complied with at an early date as possible.

The fact was brought to the attention of those by Conachis, able Director of Veterinary Services, and should be borne in mind by veterinarians, as well as livestock breeders, that the unaccreditated areas, are often surrounded by adjoining herds where the disease might be prevalent. It was gathered that Canada's Health of Animals Branch had suffered from a shortage of veterinarians for the work of accreditation, nevertheless, though handicapped for want of personnel, the testing of herds was making good progress.

Warble Fly Control

Relative to spray program against the warble fly, Prof. A. W. Naker from the Ontario Agricultural College, stated that Goderich Township, Huron County, Ontario, had been selected as a control center, all animals in the township would be sprayed thoroughly and checked for results, under qualified supervision.

The month of April has been selected as the



a, Warble fly (heel fly) ***Hypoderma lineatum***, *b*, eggs of this fly attached to a hair, *c*, larva before it hatches

time to conduct such tests, the first two weeks being selected by the Ontario committee on warble fly eradication, with an interval of two to three weeks between each spraying and checkup. The committee believes that so treating cattle will be more satisfactory than hand spraying and will relieve economic pressure on the cattle owner, as other treatments heretofore, employed had proved a waste of time and money, due to inefficient, improper spraying.

Grubs from the warble fly, it was stated, were destroyed from a percentage of 36 to 80 after an application at 400 pound pressure of sprays consisting of 7.5 pounds of derris powder to 80 gallons of water.

It was recommended that derris or cube powder (5% rotenone) should be used at the rate of 7.5 pounds per 80 gallons of water; one gallon of the mixture should be applied thoroughly to each animal, with a pressure of 400 pounds at an angle ranging from 40 to 90 degrees. The spray gun nozzle being held no more than a foot from the surface on the back and an area of two feet wide should be covered.

W. T. GALBRAITH, V.S.

London, Ont.

Abstracts

Effect of Antigen Injection on Eosinophils

Histamine, acetylcholine and cysteine[22], of themselves, are not eosinophilotactic, but they enhance the eosinophilic response in sensitized animals, or in normal animals given a single injection of an antigen such as ascaris keratin.

Substances which diminish or prevent anaphylaxis also diminish or prevent eosinophilia.

The refractoriness of the eosinophilic response to repeated injections of antigen in sensitized animals is due to neutralization of the hypersensitive state and not to depletion of the reserves of eosinophils. No eosinophilotactic substances could be found in the blood of shocked animals.—H.J.M.

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Development of the Fetal Brain

Bancroft and Barron[21] studied the normal behavior of 200 sheep fetuses ranging in age from 32 to 147 days with special reference to respiratory movements and to righting and postural movements. Movements of the diaphragm and intercostal muscles were first observed in a fetus 38 days old. The respiratory movements pass through four phases of development: (1) a phase in which the diaphragm contracts with the muscles of the neck and only with them; (2) a phase in which contractions of the diaphragm are dependent on muscular activity but are not linked to the activity of any specific group of muscles; (3) a phase in which the respirations outlast the stimulus or body activity, and (4) a phase of inhibition. Righting and postural efforts develop in the following order: tonic neck reflexes on the legs; head righting; compensatory movements of the eyes and body righting. The region of the brain responsible for the tonic neck reflexes on the legs is the upper cervical portion of the cord and the lower part of the medulla, and that for the head righting is in the pons and the lower part of the midbrain. The region of the brain responsible for the first two phases of respiration is in the lower part of the medulla, that for the third phase in the pons and that for the fourth phase in the caudal half of the midbrain. Compensatory movements of the eyes and body righting occur only if the brain stem behind the diencephalon and spinal cord is intact.—H.J.M.

[21]Bancroft, J. and Barron, D. H. 1943, Observations on the functional development of the fetal brain. *J. Comp. Neurol.* 77:431.

[22]Campbell, D. H. 1943. Relationship of the eosinophil response to factors involved in anaphylaxis *J. Infect. Dis.* 72:42.

Canine Distemper Treated with Virus

Treatment of distemper[24] was attempted in 65 cases with the virus absorbed in aluminum hydroxide. Forty milligrams were injected subcutaneously at the first visit to the patient. Secondary symptoms were treated in the usual way. There were 49 recoveries.

Best results were seen in animals in which the temperature was below 104° F. and where the treatment was started before or as soon as secondary symptoms appeared. When the temperature was over 104° F. or if the animal was markedly depressed, results were poor. In the cases which responded, amelioration of symptoms was rapid and cure was obtained in 8 to 10 days. The cure was considered permanent if no untoward effects were seen for 40 days after the injection of the virus.

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Another Vector of Rabies Discovered

As is well known, cattle cannot be grazed on some vast, high plateaus in South America, except they are vaccinated annually against rabies[27]. The principal vector of rabies in those districts is the vampire bat (*Desmodus rotundus*). Less frequently these bats inoculate horses and sometimes though rarely, man. The area in which bats are recognized as vectors of rabies among animals may be much extended by studies of Pawan[28], who says that the saliva of frugivorous bats may contain the virus of rabies, and man, livestock and other mammals bitten by these bats may be infected.

Like the vampire bat, the fruit-eating bat (*Artibeus planirostis trinitatis*) exhibits no symptoms of rabies other than an aggressiveness. Pawan speaks of "bats flying from fruit trees and attacking animals and even man." Frugivorous bats lived an average of 130 days after being inoculated artifically with rabies virus. The author concludes: "While the elimination of the blood feeding vampire remains the main objective in the antirabies bat campaign, it should not be forgotten that fruit eating bats, when rabid, may bite mammals and measures for reducing their numbers should not be lessened."

It is not known that other than insectivorous bats inhabit continental United States, but vampire bats which are slowly spreading northward from Central America have now reached points in Mexico only 300 miles south of the Rio Grande. Crossing the Border into the southwestern states appears possible at any time.

[24]Groulade, P. Le Traitement de la Maladie de Carreé par le Virus Absorbé sur hydroxyde d'alumine et Desséché. *Bul. de l'Académie vétérinaire de France.* 1948 *21;* 369-70.

[27]A new reason for eradicating rabies, *Vet. Med.* 42:279 (August) 1947.

[28]Pawan, J. L. 1948. Fruit-eating bats and paralytic rabies. *Annals of Tropical Med.* 42:178 (September)

Book Reviews

Canine Surgery. *A text and reference.* The work of 24 American authors. Edited by *H. Preston Hoskins,* V.M.D. and *J. V. Lacroix,* D.V.S. First edition, 556 pages, 345 illustrations. Published by *The North American Veterinarian, Inc.,* Evanston, Illinois, 1949. Price $12.00.

The veterinary practitioner and veterinary student in this country has needed for a long time—a good text and reference book on modern canine surgery and related subjects. This is it.

The book presents a fine appearance, is beautifully bound, printed in legible type and freely illustrated with photographs, some actual operating room scenes, and drawings. The author list of 24 American veterinarians include nationally known veterinary surgeons who are now practicing and teaching their methods reported in this work as practitioners or instructors in our veterinary colleges. All material has been thoroughly edited with a view to give surgical details in brief and concise form, yet the text material is not in any sense elementary. Much has been left for class room elucidation.

The first chapter of Canine Surgery presents, in short paragraphs, some anatomical considerations of the dog that are related to common operative procedures on this animal. The major portion of this chapter has to do with abdominal structures, although attention of the reader has been drawn to others. The importance of anatomy to the surgeon goes without saying and it is well known that careless disregard, particularly of structures of the venous and nervous systems, regularly result in disappointment to the surgeon and suffering by the animal patient.

Physiology, especially as it applies to regeneration of tissue, and preoperative considerations are recommended for careful reading. Sterilization and the procedure of a sterile technic, for thoughtful consideration. This reviewer is definite in the opinion that the cry "impractical" is *passe* as it refers to elements of sterile operative technic. Ways and means are available to make the practice of veterinary surgery a professional job for which owners of pet animals are willing to pay a professional fee. This is to say nothing of the satisfaction of watching with interest healing by first intention without unsightly scar and prompt recovery from preoperative symptoms.

Anesthesia draws its rightful share of space. Obviously good surgery is not possible on a struggling patient. Neither is it necessary. Anesthetic agents are available for use to prevent pain and the practitioner is under obligation to his client to use them when indicated. Considerable space is given to methods of ether anesthesia, intratracheal intubation, as well as to intravenous general anesthetic methods.

The surgical operative procedures are grouped according to body region. Not all procedures are treated in detail but a rather wide variety of some 80 or more specific operations on the dog are discussed. They range from dental repair, tonsilectomy, surgical drainage in chronic otorrhea, operations on the eye and surrounding structures, an imposing group involving abdominal organs and on the genito-urinary system, fractures, luxations to cosmetic surgery.

The volume is written in a spirit to encourage others in the profession to improve their proficiency in surgery. It is recommended for reading and for continued reference. It may be a long time before a better book on the subject is available.—R.L.A.

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Bulletins, Circulars, Reprints, etc.

What's New in Farm Science.—Bul. 440, University of Wisconsin, Agr. Exp. Sta., Madison.

Aureomycin; A New Antibiotic.—A 168-page booklet containing papers by 43 authors on the discovery, production, action and uses of this new member of the antibiotic group. Annals of the New York Academy of Science 51:175-342, New York, New York.

Good Milking Practices.—An extended description of the rapid method of milking introduced by Professor W. E. Petersen. It should be placed in the hands of every dairyman in whose herd mastitis control is undertaken. Ext. Bul. 293, Michigan State College, East Lansing.

Thyroprotein Stimulation in Swine.—Report of an experiment in which a considerable number of Duroc Jersey, Yorkshire, and Berkshire pigs were given thyroprotein at the rate of 1.4, 2.8 and 5.6 grams per 100 pounds of feed. Significantly greater gains resulted in the groups receiving the hormone at the 1.4 and 2.8 gram levels than were made by the control animals. Technical Bul. 209, Michigan Agr. Exp. Sta., East Lansing.

Rinderpest Vaccine.—A 72-page booklet dealing with the production and use of rinderpest vaccine. A brief history of rinderpest vaccines is given beginning with Koch's goat virus in 1897 and describing all that have been produced since; including an extended account of the production of avianized and lapinized vaccines at Gross Isle during the war. The principal discussion is of the use of rinderpest vaccine in the Philippines, in India, in China and Malay and in various parts of Africa. Discussions at a rinderpest conference at Nairobi, attended by representatives of 22 nations, are included in the text. Available from UN Bookstore, Lake Success, N. Y.